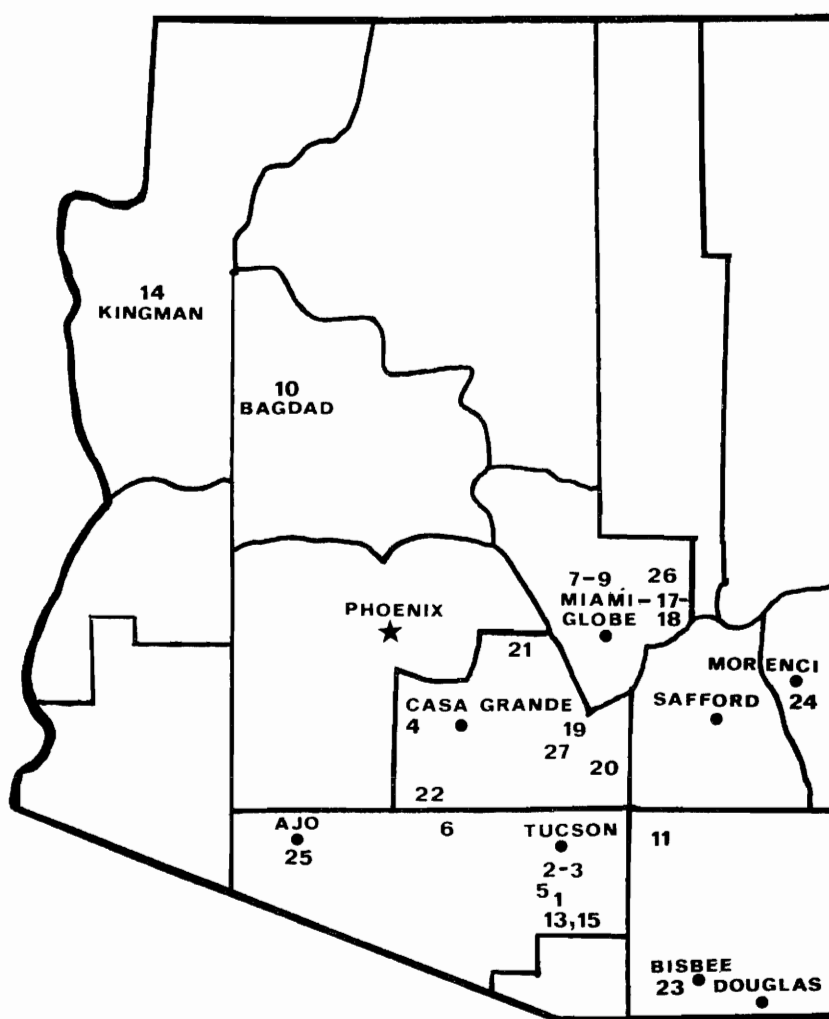


THE PRIMARY COPPER INDUSTRY OF ARIZONA IN 1983 SPECIAL REPORT NO. 8



BY

CLIFFORD J. HICKS
FIELD ENGINEER

ARIZONA DEPARTMENT OF
MINES AND MINERAL RESOURCES

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ABOUT THE COVER

The producing copper mines and operations listed below correspond to the location and numbers on the cover.

COMPANY

#. Mine

ANAMAX MINING COMPANY

1. Twin Buttes
2. Eisenhower

RANCHERS EXPLORATION & DEVELOPMENT CORP.

26. Bluebird
27. Old Reliable

ASARCO INCORPORATED

2. Eisenhower
3. Mission
4. Sacaton
5. San Xavier
6. Silver Bell

CITIES SERVICE COMPANY/PINTO VALLEY COPPER CORP.

7. Copper Cities Operations
8. Miami Mine
9. Pinto Valley

CYPRUS MINES CORP.

10. Bagdad
11. Johnson
12. Pima

DUVAL CORP.

13. Esperanza
14. Mineral Park
15. Sierrita

INSPIRATION CONSOLIDATED COPPER CO.

16. Christmas
17. Inspiration
18. Oxhide Mine

KENNECOTT CORPORATION

19. Ray

MAGMA COPPER CO.

20. San Manuel
21. Superior

NORANDA LAKESHORE MINES, INC.

22. Lakeshore

PHELPS DODGE CORP.

23. Copper Queen Branch
24. Morenci Branch
 - Metcalf Mine
 - Morenci Mine
25. New Cornelia

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To John H. Jett, Director, ADMMR, appreciation for the opportunity to compile data relative to Arizona's copper industry in 1983 and present it in convenient form.

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1983

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Clifford J. Hicks, Field Engineer

January 1985

ARIZONA DEPARTMENT OF MINES & MINERAL RESOURCES

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1/ Throughout this report a "Ton" means a short ton (2,000 pounds or 0.90718 metric ton).

INTRODUCTION

The Arizona Department of Mines and Mineral Resources presents herein a report covering activity in Arizona's copper industry in the calendar year 1983. A brief review of operational highlights reported by the major developers and producers in the State, market and price developments which affected copper production and discussions of Arizona inventory and severance taxes on metalliferous minerals are included.

The contained statistical tables include various production, employment, inventory, import/export, prices, costs and ore reserve numbers for 1983. Production of recoverable copper is given for individual mines and by company. Figures showing the importance of copper in the mining industry are furnished, as are data on the by-products of copper mining; gold, silver and molybdenum. In addition, historical compilations are included for leach copper, average grade of ore produced, percent copper recovered, open pit mine stripping ratios, and employment and earnings. Additional compilations indicating refined copper inventories in and out of the United States and average copper prices by month from 1973 through 1983 are provided. Also included are tables showing designed mine capacity and copper reserves in Arizona plus estimated international copper production pound costs.

The Department maintains extensive reference libraries in its Phoenix and Tucson offices concerning the copper industry in Arizona. These repositories include information on individual mines and mining companies, United States Bureau of Mines and United States Geological Survey publications, other professional publications and periodicals and earlier editions of this report. Additionally, experienced mining engineers are available for consultation, at no charge, on matters germane to the minerals industry. Office hours are 8 a.m. to 5 p.m. on all non-holiday weekdays.

COPPER PRODUCTION IN ARIZONA---1983

Arizona, in spite of production curtailments and mine closures, continued to lead the nation in the production of copper. In 1983 the state's mines produced 755,446 tons of recoverable copper, down 10% from 1982 production and 34% from the record 1981 production. This, however, was 65.5% of the United States total (Table XIII).

In 1983, the gross value of mineral production (excluding coal, natural gas and petroleum) in Arizona was \$1,510,878,000 (preliminary). Of this total, copper production contributed almost 76% (Table XI). Other major contributors to the total value of mineral production in the state included molybdenum (5%), gold and silver. Virtually all the molybdenum and most gold and silver are byproducts of the treatment of copper ores (Table X). As a result, Arizona ranks third in the United States production of silver and fifth in the production of gold in 1983.

Copper was produced in 20 major Arizona copper mines in 1983. Molybdenum was recovered as a by-product at 8 of the copper mines during the year (Table I). Ten mines produced 89.13% of Arizona's 1983 copper output and three produced 92.4% of the molybdenum. The four largest producers, Morenci-Metcalf, San Manuel, Inspiration and Bagdad, in descending order of productivity, accounted for more than 58% of the total copper recovered. The Morenci-Metcalf mines of the Phelps Dodge Corporation, now statistically united, led copper production with 23.5% of the total and Duval's Sierrita mine produced over 61% of the state's by-product molybdenum.

Copper produced by leaching methods during 1983 was slightly over 255 million pounds, down 15% from 1982 and accounted for 18.8% of total primary production (Table II).

Out of the seven solvent extraction/electrowinning copper recovery plants in Arizona, six operated during 1983. Solvent extraction uses a liquid ion-exchange process to increase the copper concentration of the solvent solution from which the copper is then recovered by electrolytic deposition. Some of the advantages of solvent extraction over the cementation process are: no air pollution is produced, there is a net reduction in energy costs, and the end product is high grade cathode copper which can be marketed directly.

There were thirteen open pit copper mines operating in the state in 1983. The stripping ratios--the amount of waste removed compared to the amount of ore mined---at these operations for the past decade are presented in Table VIII. The excessively low 1983 weighted average stripping ratio (0.57:1) reflects producers' efforts to reduce mining costs by stripping no more waste than that essential to maintain production. In the future stripping ratios can be expected to increase when the copper market recovers and mining operations become profitable.

Copper sulfide ores were the source of 82.8% of the copper produced in 1983. The average sulfide ore has averaged 0.596% Cu from 1973 through 1983. 1983's weighted average sulfide grade was 0.65% Cu which indicates that somewhat higher grade ore was selectively mined during that recession year (Table VI).

Table XII shows an estimate of the capacity to produce primary copper at each of the state's principle operations. Total estimated design capacity is 1.248 million tons annually. The Arizona mines, their concentrators and leach plant facilities operated at 60.7% of estimated capacity during 1983.

Employment in Arizona's copper industry was 13,864 persons during 1983. That was a decrease of almost 20% from the previous year and the lowest number since 1967 (Table XVII). However, worker productivity and average hourly earnings increased (Table XIX). The aggregate man-hours worked dropped 24%. The Arizona production worker's average hourly production of ore was 8.356 tons, 2.29 tons more than in 1982, while the average hourly production of copper was 82.766 pounds, an increase of 10.34 pounds. Earnings of the production workers rose \$0.34 to an average hourly rate of \$13.28, an increase of 2.6% (Table XIX).

In addition to the world-wide recession, albeit receding in 1983, and low priced foreign competition, many factors affect the production of copper in Arizona. Most technological factors are so interwoven that to isolate one and describe its impact is extremely difficult and often misleading. An even more difficult task is to properly evaluate the rapidly enlarging scope of economic and socio-political factors that influence daily the decisions made by developers and producers of copper. Foremost in any consideration of production capacity is the availability of deposits of copper mineralization. A list of most of Arizona's rich endowment of copper reserves is given in Table XXIII.

It should be emphasized that, although the reserves listed in Table XXIII totals billions of tons of ore, the number can move upward or downward drastically with market price, improved technology or changes in U.S. policy or economy. If, for example, socio-political factors such as capricious rules and regulations imposed by governments become too burdensome, many of these deposits may never be developed and some existing mines may be closed. One must never lose sight of the fact that the word "ore" is not a geological or mineralogical term but simply an expression of economic value. If rock containing a marketable commodity can be mined, processed, and transported and the commodity marketed at a profit then the rock is ore--if not, it is mineralized waste. However, some copper mines have been producing and selling copper for prices under cost because it is, in some instances, more economical to maintain some production than to mothball the operations.

A BRIEF REVIEW OF THE 1983 COPPER MARKET

"The U.S. economic recovery in 1983 affected primarily the consumer goods sectors, while capital spending, which in normal years may account for almost two-thirds of copper consumption, remained near its 1982 recession level. However, domestic copper consumption in 1983 increased over the 1982 level."

"On the supply side, domestic copper producers, encouraged by the improving economy in the first half of 1983, restored production at some of the mines which had been closed or curtailed in 1982. Nevertheless, U.S. mine output in 1983 was almost 10% below the 1982 level, which had been more than 25% below 1981 production."

"Copper consumption outside the U.S. remained at or below 1982's recession lows. Most other Free World economies did not participate in the economic recovery to any significant degree. However, state-owned copper producers in the developing countries, which now account for 40% of Free World production, did not adjust production levels to match the reduced demand in their traditional markets in Europe, Asia and South America and continued to maximize copper output. Much of this excess production was diverted to the U.S. causing a large oversupply in the domestic market."

"The worldwide imbalance between supply and demand caused the most copper stocks, those of the commodity exchanges in New York and London, to increase by nearly 350,000 tons in 1983. However, this increase was partly offset by drawdowns of producer stocks, and the net increase was approximately 150,000 tons of refined copper. Following a 300,000 ton increase in 1982, the 1983 rise brought worldwide copper stocks considerably above normal levels."

"By the end of 1983, there were signs of improved capital spending in the U.S. and of early stages of recovery in other major Free World economies. Demand for copper had improved sufficiently to slow the growth of copper stocks on the terminal exchanges to a rate more than offset by declining producer inventories. However, a substantial recovery in copper prices is not likely to occur until some of the excess stocks are consumed."

Source: ASARCO Incorporated Annual Report 1983.

HIGHLIGHTS OF COMPANY OPERATIONS IN ARIZONA

ANAMAX MINING COMPANY

Anamax Mining Co. is an equal partnership between Anaconda Minerals Company, a wholly owned subsidiary of the Atlantic Richfield Company and AMAX Incorporated. The company operates the Twin Buttes open-pit mine and controls the Palo Verde ore reserves under a lease from the State of Arizona. An agreement is in effect with ASARCO Incorporated for mining the Palo Verde deposit. Anamax is an equal partner with ASARCO in the Eisenhower Mining Company which mines the Palo Verde deposit. Anamax's share of Eisenhower ore is processed at the Twin Buttes mill.

"Under the terms of a consent order issued by the Federal Trade Commission on October 29, 1979, in an administrative proceeding in which it had challenged the acquisition of common stock of the Anaconda Company by Atlantic Richfield and the subsequent merger between the companies, the Company is required to divest most of its interest in Anamax by October 1984 and has been seeking a buyer for its interest. Should the Company's interest in Anamax not be sold by October 1984, the consent order provides for the appointment of a trustee with concurrent authority to solicit for the sale of the interest at fair value during the following three years. Anamax suspended sulfide mining at the Twin Buttes mine on January 31, 1983." ^{1/} The Eisenhower mine operations shut down July 31, 1983 because of a labor dispute and remained closed for the remainder of the year.

CYPRUS MINES CORPORATION

Cyprus Mines Corporation is a wholly owned subsidiary of the Standard Oil Company of Indiana. Cyprus' operations include the Bagdad, Johnson and Pima open pit operations and the Cyprus Metallurgical Processes Corporation in Tucson.

During 1981, Cyprus Mines Corporation acquired Union Oil's 25% interest in the Pima Mine. Cyprus Mines now owns 75.01% of Pima with Utah International (wholly owned by the General Electric Company) remaining the sole non-operating partner with a 24.99% share. As a result of depressed copper prices all mining and milling operations at Cyprus Pima were halted October 1, 1982 and remained closed all of 1983.

Production at Cyprus Bagdad was reduced in the first and last quarters of 1983 and Cyprus Johnson stripping and mining was reduced.

Total 1983 copper production was down 23%.

^{1/} Atlantic Richfield Company Annual Report on Form 10-K, 1983, pp. 7-8.

ASARCO INCORPORATED

ASARCO owns and operates four open pit mines in Arizona: Mission, Sacaton, San Xavier and Silver Bell. The Silver Bell mine was closed in December 1981 and remained shut down all of 1982 except for a small copper leaching operation, however, ASARCO reopened it in September 1983 in anticipation of exhaustion of ore reserves at the Sacaton mine by mid-1984 and a shortage of concentrates for the Hayden smelter. The Eisenhower open pit mine is operated and partially owned by ASARCO. The company's share of Eisenhower ore is processed with ore from the San Xavier and Mission mines at the Mission concentrator, however, production at the Eisenhower mine was curtailed on August 1, 1983 as a result of a strike against ASARCO's partner in the mine, Anamax Mining Company. Other ASARCO operations in the state include a smelter and acid plant at Hayden and the development of an underground project at Sacaton. Because of high development costs and a weak copper market, work on this mine was suspended in September 1981 and remained shut down throughout 1982 and 1983.

"Cost reduction continued to be a high priority at all of ASARCO's open pit copper mines in Arizona. At the Mission Unit, comprising the Mission, San Xavier and Eisenhower mines, total manpower was reduced 27%, principally by deferring stripping of overburden from the ore bodies. Sacaton reduced employment approximately 18% as manpower requirements declined due to the forthcoming termination of operations. Silver Bell resumed production with 16% fewer employees than prior to the shutdown as a result of not restarting the molybdenum recovery plant and because of other planned reductions." 1/

"ASARCO reached agreements with unions at its copper mines and plants on new three-year contracts commencing July 1, 1983. The contracts provide for no increase in wages, retention of the cost-of-living adjustment, and revisions to certain benefit programs which will reduce their costs." 1/

"Output at the Hayden copper smelter in Arizona was affected by curtailments necessary to permit installation of the new oxygen flash smelting furnace. Initial construction on the new furnace was completed in October (1983) on schedule and under its \$132.6-million budget. It started up in November and was into its shakedown period at year-end. ASARCO expects to have the new facilities at Hayden in full operation by April 1984." 1/

DUVAL CORPORATION

Duval is a wholly owned subsidiary of the Pennzoil Company. Duval's Arizona operation consists of the Esperanza and Mineral Park open pit mines, concentrators and precipitation plants, the Sierrita open pit mine and concentrator, a ferro-molybdenum plant the the CLEAR (Copper Leach, Electrolysis and Regeneration) plant adjacent to Sierrita which utilizes non-polluting hydrometallurgical technology to turn copper concentrate into high grade crystals (equivalent to a high grade blister copper) electrolytically. The CLEAR-process plant was temporarily shut down in April 1982 for modification of the electrolytic cells and remained closed at year end 1983.

-continued-

1/ ASARCO Annual Report, 1983. pp. 6-7.

Duval Corporation
continued

During 1982 and 1983 Duval's two smallest copper/molybdenum mines (Esperanza and Mineral Park) were closed and produced only precipitate copper. The large open pit Sierrita Mine which had been shut down since December 14, 1981, was reopened April 1, 1982 at reduced production rates and with a greatly reduced work force. At the end of 1983, production rates at Sierrita were approximately 90% of capacity. Union workers at Sierrita did not renew labor contracts upon expiration September 30, 1983. However, work was continued almost uninterrupted and with essentially the same work force as before the strike.

An innovative movable in-pit ore crushing and conveying system was on stream at Sierrita in early 1983. The system, which is the United State's first large capacity movable crushing system, can be moved to various sites within the pit by a track-type transporter as mining progresses. Crushed ore is then carried out of the mine by a conveyor system rather than trucks, resulting in a reduction in cost.

EISENHOWER MINING COMPANY

The Anamax Mining Company and ASARCO Incorporated are equal partners in the Eisenhower Mining Company which was formed to develop the Palo Verde deposit. Mining of the deposit under the joint venture agreement is expected to reduce operating costs greatly for both companies and to lengthen the life of the Mission and San Xavier Mines significantly by eliminating some pit slopes and recovering ore that would ordinarily have to be left along property lines. The agreement contains provisions governing the amount of ore each partner will receive, the timing of ore delivery and allocation of costs between the partners.

ASARCO is the mine operator and its share of the ore is processed into concentrates at the Mission mill. Anamax's share of the ore is crushed near the mine and sent 6½ miles by belt conveyor to be processed at the Twin Buttes mill.

INSPIRATION CONSOLIDATED COPPER COMPANY/INSPIRATION MINES INC.

As the result of a reorganization effective July 6, 1983, Inspiration Consolidated Copper Co./Inspiration Mines Inc., became a unit of a parent holding company, Inspiration Resources Corporation (formerly Plateau Holdings Inc.). Inspiration Consolidated Copper/Inspiration Mines conducts Inspiration Resources United States' metals business, while another unit, Hudson Bay Mining and Smelting Co., Ltd. now operates their Canadian metals business.

The company's operations in the Miami, Arizona area include the Inspiration area open-pit mine (Joe Bush, Live Oak, Red Hill and Thornton); a concentrator;

-continued-

Inspiration Consolidated Copper
continued

a ferric cure leaching solvent extraction electrowinning plant; the Ox Hide mine's precipitation plant (shut down without production in 1983); the Inspiration smelter and acid plant; and the Christmas underground, open pit mine and concentrator, shut down without production in 1983.

"The amount of concentrates available dictated a sporadic operating schedule for Inspiration Copper Smelter in 1983, which contributed to the poorer results. The Pinto Valley mine that had been the main supplier of smelter toll material remained shut during the entire year. The smelter operated successfully on domestic concentrates, some outside concentrates and a large volume of secondary materials that had accumulated during past years." 1/

"In 1983, Inspiration Copper signed a five-year agreement with Duval Corporation for the purchase of concentrates, deliveries of which began in early 1984." 1/

"At the end of May, 1983, Inspiration Copper reached agreement on new three-year labor contracts with all the unions representing its employees. This marked the first time in 20 years that new agreements were reached without a strike. The new pacts include a freeze on wage rates and pension benefits." 1/

KENNECOTT

In 1981, the Kennecott Corporation became a wholly owned subsidiary of the Standard Oil Company of Ohio (Sohio). Sohio, in turn, is 53% owned by a subsidiary of the British Petroleum Company.

The Ray Mines Division (Arizona) of Kennecott includes an open pit mine (at Ray), a sulfide concentrator, a solvent extraction-electrowinning plant, a dump leaching operation and precipitation plant, a pyrometallurgical smelter (at Hayden) and a sulfuric acid plant. Ray Mines Division was shut down from May 1982 until September 1983. Since September 1983, the mine and concentrator have been operating at full capacity, but the smelter and the electro-win cathode refinery remained closed at the end of calendar 1983. On July 1, 1983, Kennecott and the 13 international unions representing approximately 5,100 employees at Kennecott's copper operations signed new three-year labor agreements.

Kennecott is the nation's largest copper producer and has three open pit mining and processing operations with total capacity to produce about 440,000 tons of refined copper a year. The Bingham Canyon Mine southwest of Salt Lake City, Utah is the largest copper producer in the United States. Chino Mines, a two-thirds Kennecott, one third Mitsubishi partnership near Silver City, New Mexico, and Ray mines in Arizona each have about half the capacity of Bingham. In addition to copper, Kennecott produces by-product metals including gold, silver, and molybdenum. 2/

1/ Inspiration Resources Corporation, 1983 Annual Report, p. 9.

2/ Source: The Standard Oil Company (Ohio) Annual Report 1983 and Form 10-K.

MAGMA COPPER COMPANY

Magma is a wholly owned subsidiary of Newmont Mining Corporation. Magma operates two underground mines, San Manuel (40 miles northeast of Tucson) and Superior (65 miles east of Phoenix) with a concentrator at each. Also located at San Manuel are a smelter, a sulfuric acid plant, an electrolytic refinery and a continuous rod casting plant. The Superior mine was shut down in August 1982 and remained on care and maintenance status in 1983.

"The San Manuel mine operated at 83 percent of capacity, slightly lower than the rate in 1982. It produced 18.3 million tons of ore at an average grade of 0.64 percent copper during the year, compared with 18.2 million tons at an average grade of 0.66 percent in 1982." 1/

"Mine development at the San Manuel mine was limited to the level required to support continuing production at the 80 percent capacity operating range." 1/

"A major research project was started in 1983 to determine the feasibility of recovering copper from the large quantity of copper oxide ores that overlay the sulphide ore body at the San Manuel mine." 1/

"At mid-year, Magma signed three-year labor agreements with the labor unions representing its workers. The agreements reduced some fringe benefit costs and provided for wage increases to be limited solely to cost-of-living adjustments." 1/

NORANDA LAKESHORE MINES, INC.

Noranda Lakeshore Mines, Inc. is a wholly owned subsidiary of Noranda Mines Ltd. of Canada. The mine is located 28 miles southwest of Casa Grande, Pinal County, on the Papago Indian Reservation.

All underground development was suspended in April 1982, but a successful test program resulted in the development and construction of a full scale in-situ leach facility designed to extract copper from the broken low grade oxide ore remaining from the mined out block cave operation.

Underground mining and vat leaching at Lakeshore was terminated in late 1983 and replaced by in-situ leaching. Pregnant solutions are pumped from collection sumps and dams to the surface for distribution to the solvent extraction-electrowinning plant.

PHELPS DODGE CORPORATION

Phelps Dodge has five operating copper units in Arizona: 1. The Morenci Branch is comprised of the Morenci open pit mine which now includes the Metcalf open pit mine, two concentrators, a dump leaching and precipitation
-continued-

1/ Newmont Mining Corporation Annual Report, 1983 p. 11

Phelps Dodge Corporation
continued

plant, the Morenci smelter and acid plant. 2. The New Cornelia Branch at Ajo includes an open pit mine, a concentrator, a smelter and acid plant. 3. The Copper Queen at Bisbee consists of leaching activities at the Lavender pit, underground mines and dumps and a precipitation plant. 4. The Douglas Reduction Works (Douglas, AZ) operates a smelter with a rated capacity of 700,000 tons per year of input material. 5. The Safford Branch is a low-grade sulfide copper deposit near Safford, AZ. Active underground development work was suspended in April 1982 and has, since then, been maintained in standby condition.

The Corporation also owns a low-grade sulphide copper deposit in Copper Basin, southwest of Prescott, Arizona. This deposit is estimated to contain 175 million tons of copper-bearing material averaging 0.55% copper and 0.021% molybdenum. No significant progress was made during 1983 in advancing the Corporation's applications to exchange land it owns in northern Arizona for land owned by the Federal government that will be needed eventually to bring this property into production. Until the land exchanges are accomplished no decision can be made concerning when to bring the property into production." 1/

The Morenci and Ajo concentrators incorporate molybdenum flotation sections which permit molybdenum disulfide to be extracted from the copper concentrates when it is economic to do so.

"The concentrates and precipitates produced from the Corporation's properties, together with concentrates smelted on toll for other companies and minor amounts of purchased ores and concentrates, are smelted at the Corporation's smelters at Morenci, Ajo and Douglas, Arizona and at its Hidalgo smelter at Playas, New Mexico. Production at the three Arizona smelters was suspended in April 1982 coincident with the closing of the mines and concentrators. Operations (mining) resumed as follows: Morenci - October 1982; Ajo - February 1983; and Tyrone - May 1983. Mining at Metcalf, which had been suspended at the end of 1980, resumed with the Morenci start-up in 1982 in order to exploit a substantial tonnage of ore that could be mined with a lower waste stripping ratio than usual. The Morenci and Metcalf pits are managed as an integrated mining unit." 1/

"The Douglas smelter resumed operation on a reduced basis in mid-July 1982, was shut down again in November 1982, and was restarted in April 1983. The Morenci smelter was restarted at a reduced production rate in mid-October 1982 in conjunction with the reopening of the Morenci mine and concentrators. Concentrates produced by the Morenci concentrators in excess of the amounts that could be treated at the Morenci smelter were smelted at the Hidalgo and Douglas smelters or sold. Concentrate produced at Ajo has been smelted principally at Douglas while operations at the Ajo smelter have been suspended." 1/

Labor union contracts with Phelps Dodge which expired in 1983 were not successfully renegotiated and a general worker's strike occurred at all Arizona branches on July 1, 1983. The strike was not settled by the end of calendar 1983, but production continued with non-union labor.

1/ Phelps Dodge Annual Report on Form 10-K, 1983, pp. 3-5.

PINTO VALLEY COPPER CORPORATION

Pinto Valley Copper Corporation is a wholly owned subsidiary of Newmont Mining Corporation. It was established in March 1983, to acquire the mines, mill and electrowinning facilities of the Miami Division of Cities Service Company. Unfavorable market conditions and low copper prices in 1983 caused Pinto Valley Copper to limit production to its low-cost leaching and solvent extraction-electrowinning operations. All mining and milling operations remained shut down and development of the Miami East underground ore body was suspended. The precipitation plant at the Copper Cities operations was shut down in June 1982 and is no longer considered a production unit.

In July, 1983, Pinto Valley entered a new three-year labor agreement following the previously established industry pattern.

"Existing Pinto Valley contracts for smelting and refining of concentrates were to expire in September, 1984. Agreement was reached in January 1984, to cancel these contracts on advantageous terms." 1/ Future Pinto Valley production will be treated at the Magma smelter and refinery.

RANCHERS EXPLORATION AND DEVELOPMENT CORPORATION

The Bluebird mine, located a few miles west of Miami, Gila County, Arizona, is owned and operated by Ranchers Exploration and Development Corporation. This open pit copper mine suspended active excavation in July 1981, but some copper was recovered in 1982 by the sulfuric acid leaching of pre-existing oxide ore heaps and running the pregnant solutions through a solvent extraction-electrowinning plant.

"Production from the mine was discontinued on October 25, 1982, due to the unavailability of low-cost acid for leaching and the depletion of the leach heaps. During the period from July 1, 1982 to October 25, 1982 approximately 3.1 million pounds of copper were produced." 2/ Operations remained closed during the remainder of 1982 and all of 1983.

Note: In late July 1984, a merger of Ranchers Exploration and Development Corporation into Hecla Mining Company was completed. The merger made Hecla the largest domestic silver producer.

1/ Newmont Mining Corporation Annual Report, 1983, pp. 11-12

2/ Ranchers Exploration and Development Corporation Annual Report on 10-K 1983, p. 17.

CONTACT INFORMATION FOR MAJOR COPPER PRODUCERS
OPERATING IN ARIZONA

Anamax Mining Company

Twin Buttes Mine, Box 127, Sahuarita, AZ 85629. Phone (602) 791-2810.

ASARCO Incorporated, 120 Broadway, New York, NY 10271. Phone (212) 669-1000

Tucson Office, 1150 N. 7th Avenue, P.O. Box 5747, Tucson, AZ 85703.
Phone (602) 792-3010.

Hayden Unit, P.O. Box 98, Hayden, AZ 85235. Phone (602) 356-7804.

Mission Unit, P.O. Box 111, Sahuarita, AZ 85629, West Pima Mine Road.
Phone (602) 791-2920.

San Xavier Unit. Same as Mission Unit.

Sacaton Unit, P.O. Box V, Casa Grande, AZ 85222. Phone (602) 836-2171.
Located 3 miles northwest of Casa Grande on Maricopa Road.

Silver Bell Unit, Silver Bell, AZ 85270. Phone (602) 622-6751.

Cyprus Mines Corporation, 7000 S. Yosemite St., Englewood, CO 80112. Phone
(303) 740-5000.

Cyprus Bagdad Copper Company, P.O. Box 245, Bagdad, AZ 86321. Phone (602)
633-2241.

Cyprus Johnson Copper Company, P.O. Drawer R, Benson, AZ 85602. Phone
(602) 586-2241. Located 1½ miles north of Highway I-10 via Exit 322.

Cyprus Pima Mining Company, P.O. Box 7187, Tucson, AZ 85725. Phone (602)
791-2870.

Duval Corporation, 4715 E. Fort Lowell Road, Tucson, AZ 85712. Phone (602)
323-5600.

Mineral Park Division, P.O. Box 3009, Kingman, AZ 86401. Phone (602)
565-2226. Located 7 miles north of Kingman.

Esperanza and Sierrita Properties, P.O. Box 125, Sahuarita, AZ 85629.
Phone (602) 791-2950. Located 32 miles south of Tucson.

Inspiration Consolidated Copper Company/Inspiration Mine Inc.

Inspiration, P.O. Box 4444, Claypool, AZ 85532. Phone (602) 473-7000.

Kennecott, Ten Stamford Forum, Stamford, CT 06904. Phone (203) 964-3000.

Ray Mines Division, P.O. Box 9, Hayden, AZ 85235. Phone (602) 356-7811.

Ray, AZ (mine), phone (602) 363-5531.

Magma Copper Company, P.O. Box M, San Manuel, AZ 85631. Corporate headquarters.
Phone (602) 385-2201.

San Manuel Division (Same as corporate headquarters above).

Superior Division, P.O. Box 37, Superior, AZ 85273. Phone (602) 689-2444.

Noranda Lakeshore Mines, Inc., P.O. Box C-6, Casa Grande, AZ 85222. Phone (602) 836-2141.

Phelps Dodge Corporation, 300 Park Ave., New York, NY 10022. Phone (212) 940-6400.

Western Operations Office, 2600 N. Central Avenue, Phoenix, AZ 85004-3015. Phone (602) 234-8100.

Douglas Reduction Works, P.O. Drawer E, Douglas, AZ 85607. Phone (602) 365-2441.

Copper Queen Branch, Highway 92, Bisbee, AZ 85603. Phone (602) 432-3621.

Morenci Branch, Morenci, AZ 85540. Phone (602) 865-4521.

New Cornelia Branch, Ajo, AZ 85321. Phone (602) 387-7451.

Safford Branch and Small Mines and Mine Development, Box 151, Safford, AZ 85546. Phone (602) 428-6900.

Pinto Valley Copper Corporation, Box 100, Miami, AZ 85539. Phone (602) 425-7611.

Ranchers Exploration and Development Corporation. Merged into Hecla Mining Company, July, 1984, Hecla Bldg., Wallace, Idaho 83873. Phone (208) 752-1251.

Parent Companies

ASARCO Incorporated, 120 Broadway, New York, NY 10271.
(Anamax Minerals Company, 50%)

Atlantic Richfield Company, 515 South Flower St., Los Angeles, California 90071.
Phone (213) 486-3511.
(Anaconda Minerals Company, 100%-Anamax Minerals Company, 50%)

Hecla Mining Company, Hecla Bldg., Wallace, Idaho 83873. Phone (208) 752-1251.
(Ranchers Exploration and Development Corporation merged into Hecla Mining Co., July, 1984)

Inspiration Resources Corporation, 250 Park Ave., New York, NY 10177. Phone (212) 503-3100.
(Inspiration Consolidated Copper Company/Inspiration Mines Inc., 100%)

Newmont Mining Corporation, 300 Park Ave., New York, NY 10022. Phone (212) 980-1111.
(Magma Copper Company and Pinto Valley Copper Corporation, 100%)

Noranda Mines Ltd., P.O. Box 45, Commerce Court West, Toronto M5L 1B6, Ontario, Canada. Phone (416) 867-7111.
(Noranda Lakeshore Mines, Inc., 100%)

Pennzoil Company, P.O. Box 2967, Houston, Texas 77252-8200. Phone (713) 564-4000.
(Duval Corporation, 100%)

Standard Oil Company (Indiana), 200 East Randolph Drive, Chicago, Illinois 60601.
(Cyprus Mines Corporation, 100%)

Standard Oil Company (Ohio), Midland Building, Cleveland, Ohio 44115. Phone
(216) 575-4141.
(Kennecott, 100%)

SEVERANCE TAX ON METALLIFEROUS MINERALS

Background

Laws of 1982, Chapter 230 repealed the tax on sales of metalliferous minerals and enacted a severance tax in its place. Under the provisions of the severance tax, metalliferous minerals were to be taxed at the time of production, not at the time of sale. All metalliferous minerals produced after 1982 were to be taxed on the greater of the following two values:

1. The "weighted mineral value" which is essentially the cost of extracting the minerals from the earth and delivering them to the site where they will be processed, or
2. A specified percentage of the old sales tax base.

The severance tax was to be levied on metalliferous minerals at a rate of 2½ percent. Unless otherwise provided by law, the tax was to be administered in the same manner as the sales tax. As a result, severance tax payments were due on the first day of the second month following the month in which the tax accrued. From January 1, 1983 through June 30, 1983, 40 percent of the severance tax was to be distributed in the same manner as the transaction privilege tax (i.e. 25 percent to the cities, 33.6 percent to the counties and 41.4 percent to the state). In subsequent fiscal years, a progressively larger share of the severance tax was to be distributed in the same manner as the transaction privilege tax. The balance of severance tax collections, after making this distribution, was to be deposited each year in the state's general fund. (Effective from and after December 31, 1982.)

Laws of 1983, Chapter 4 changed the due date for payment of the Severance Tax to the twentieth day of the month following the month in which the tax accrues. Taxes were to be delinquent if not received by the Department of Revenue on the day preceding the last day of the month in which they were due. (Effective April 1, 1983.) The law also changed the interest rate on delinquent tax payments to equal the rate established by Section 6621 of the Internal Revenue Code, compounded annually. (Effective February 11, 1983.)

Legal Citation

A.R.S. 42-1461 - 42-1466.

Paid by

Persons engaged in the business of extracting substances from the earth that become metalliferous minerals (A.R.S. 42-1461 - 42-1462.)

Exemptions

None.

Severance Tax on Metalliferous Minerals continued

Tax Base

The severance tax is levied on the "net severance base" of all metalliferous minerals produced after 1982. (42-1462) The "net severance base" is the greater of the following two values (42-1464, Laws of 1982, Chapter 230, Section 12):

1. The "weighted mineral value", or
2. A specified percentage of the old sales tax base (the gross value of production less out-of-state processing costs). This value will be referred to as the "Arizona value" after June 30, 1985.

The "weighted mineral value" is essentially the cost of extracting the minerals from the earth and delivering them to the site where they will be processed.

The "weighted mineral value" is determined using the following formula (42-1464):

$$\text{weighted mineral value} = \frac{\text{mining costs}}{\text{total production costs}} \times \text{gross value of production}$$

where:

mining costs represent the cost of extracting the minerals from the earth and delivering them to the site where they will be processed further (42-1461).

total production costs include most of the major costs incurred in mining and processing minerals until the point of sale (42-1461).

gross value of production is determined by multiplying the recoverable units of a metallic product by the per unit price of the product; the price per unit does not include the cost of manufacturing, fabricating or otherwise transforming a refined mineral product, when these activities occur prior to sale of the product (42-1461).

Although metalliferous minerals will no longer be taxed on the old sales tax base, the value of minerals produced after 1982 may not fall below a specified percentage of the old tax value. (42-1464, Laws of 1982, Chapter 230, Section 12). The old tax value included not only the cost of extracting the minerals from the earth, but most of the major in-state costs of producing the minerals. This value was determined by multiplying the recoverable units of a metallic product by the per unit price and deducting the out-of-state processing costs from the result. (42-1464; Laws of 1982, Chapter 230, Section 12; 41-1461). The following table shows the minimum percentage of the old tax value that may be assigned to minerals for severance tax purposes. (42-1464; Laws of 1982, Chapter 230, Section 12):

Severance Tax on Metalliferous Minerals continued

| <u>Period during which minerals are produced</u> | <u>Minimum value of minerals for purposes of determining the severance tax</u> |
|--|--|
| January 1, 1983 - June 30, 1983 | 100% of the old taxable sale value |
| July 1, 1983 - June 30, 1984 | 83-1/3% of the old taxable sale value |
| July 1, 1984 - June 30, 1985 | 66-2/3% of the old taxable sale value |
| July 1, 1985 and thereafter | 50% of the old taxable sale value |

Tax Rate

During fiscal years 1980-81, 1981-82 and 1982-83, businesses that produced mineral products were permitted to claim a tax credit against the Special Excise Tax for Education. The tax credit was determined by formula (see "TAX CREDIT" under "SPECIAL EXCISE TAX FOR EDUCATION"). The tax credit could not exceed the taxpayer's Special Excise Tax liability for the year. However, if a taxpayer had an unused amount of credit for any year in which his production was curtailed due to economic conditions, the unused credit could be carried forward for a period not to exceed three years. Since the Special Excise Tax does not apply to metalliferous minerals after December 31, 1982, businesses that produce metalliferous minerals are authorized to claim this tax credit against their severance tax liability, beginning in 1983. In 1982-83, the amount of credit claimed may not exceed 40 percent of the taxpayer's severance tax liability. (Laws of 1982, Chapter 228, Section 2; Laws of 1982, Chapter 230, Section 15)

Due Date

Collections from the severance tax on metalliferous minerals are due on the twentieth day of the month following the month in which the tax accrues. Taxes are delinquent if they are not received by the Department of Revenue on the day preceding the last day of the month in which they are due. The due date may be extended by the Department of Revenue for good cause, but not beyond the first day of the third month following the regular due date. (42-1465, 42-1322)

Collecting Agency

Department of Revenue. (42-1462, 42-101)

Dedication or Purpose

To aid in defraying the necessary and ordinary expenses of the state, cities, and counties to reduce or eliminate the annual tax levy on property for state, city and county purposes and to reduce the levy on property for public school education. (Laws of 1982, Chapter 230, Section 17)

Yield

No monies will be collected from this tax until fiscal year 1982-83.

Severance Tax on Metalliferous Minerals
continued

Distribution

Each year, a portion of severance tax collections will be distributed in the same manner as the transaction privilege tax (i.e. 25 percent to the cities, 33.6 percent to the counties and 41.4 percent to the state). The portion of collections that is distributed in this manner will increase each fiscal year until 1986-87. The table below shows the amount of severance tax collections that will be distributed in the same manner as transaction privilege taxes during each fiscal year. (42-1465, Laws of 1982, Chapter 230, Section 16)

| <u>period during which collections are received</u> | <u>portion of severance tax collections distributed in the same manner as the transaction privilege tax</u> |
|---|---|
| January 1, 1983 - June 30, 1983 | 40% |
| July 1, 1983 - June 30, 1984 | 48% |
| July 1, 1984 - June 30, 1985 | 60% |
| July 1, 1985 and thereafter | 80% |

After making this distribution the balance of severance tax collections will be deposited each year in the state's general fund and is appropriated for public educational purposes. (42-1465; Laws of 1982, Chapter 230, Section 16)

Source: State of Arizona Tax Handbook - 1983
Prepared by the Staff of the Joint Legislative Budget Committee

INVENTORY TAX ON METALLIFEROUS MINERALS

Background

Laws of 1982, Chapter 230, Section 13, established an inventory tax on metalliferous minerals. The tax was to be imposed on each producer's 1982 year end inventory of mined metallic products. In determining the tax, producers were allowed to deduct the value of any inventory which had previously been taxed or was exempt from taxation under the sales tax laws of this state. The inventory tax was to be levied at a rate of 1-1/2 percent and was payable in twelve equal monthly installments. The first installment was to be paid to the Department of Revenue on or before March 6, 1983. Taxpayers who were not mining in January of 1983 could be granted a one month extension for each month after December that the mine did not produce. The due date for the first monthly installment could not, however, be extended for more than six months. Under the provisions of this law, 40 percent of collections from the inventory tax was to be distributed in the same manner as the transaction privilege tax. The remaining collections were deposited directly into the general fund. (Effective from and after December 31, 1982.)

Legal Citation

See Session Laws of 1982, Chapter 230, Section 13.

Paid By

Persons engaged in the business of extracting substances from the earth that become metalliferous minerals (Laws of 1982, Chapter 230, Section 13, 42-1461)

Exemptions

None

Tax Base

The Inventory Tax is levied on the "net severance base" of the 1982 year end inventory of all metalliferous minerals in this state. The net severance base is determined as follows:

1. Calculate the gross value of production for all metallic products in the 1982 year end inventory. The gross value of production is determined by multiplying the recoverable units of a metallic product by the per unit price of the product; the price per unit does not include the cost of manufacturing, fabricating or otherwise transforming a refined mineral product, when these activities occur prior to sale of the product.
2. Subtract the out-of-state processing costs from the gross value of production for all metallic products in the 1982 year end inventory. Out-of-state processing costs means processing costs incurred by the taxpayer out of this state, including freight charges for shipping metallic products out of state.

Inventory Tax on Metalliferous Minerals
continued

3. From the difference determined in step #2, deduct the value of metallic products that were previously taxed or were exempt from taxation under the sales tax laws of this state.

(Laws of 1982, Chapter 230, Section 13; 42-1461)

Tax Rate

Two and one-half percent of the net severance base. (Laws of 1982, Chapter 230, Section 13)

Tax Credit

During fiscal years 1980-81, 1981-82 and 1982-83, businesses that produced mineral products were permitted to claim a tax credit against the Special Excise Tax for Education. The tax credit was determined by formula (see "TAX CREDIT" under "SPECIAL EXCISE TAX FOR EDUCATION"). Since the Special Excise Tax does not apply to metalliferous minerals after December 31, 1982, businesses that produce metalliferous minerals are authorized to claim this tax credit against their inventory tax liability, for the remainder of the 1982-83 fiscal year. The amount claimed may not exceed 40 percent of the taxpayer's inventory tax liability. (Laws of 1982, Chapter 230, Section 15)

Due Date

Collections from the inventory tax on metalliferous minerals are payable in twelve equal monthly installments, with the first installment due on or before March 6, 1983. If a taxpayer was not mining in the month of January 1983, the Department is required to grant a one month extension of the date when the first monthly installment is due. For each subsequent consecutive month that a taxpayer does not mine, the Department is required to grant an additional one month extension. In no event shall the due date for the first monthly installment be extended for more than six months. (Laws of 1982, Chapter 230, Section 13)

Collecting Agency

Department of Revenue. (Laws of 1982, Chapter 230, Section 13)

Dedication or Purpose

To aid in defraying the necessary and ordinary expenses of the state, cities and counties, to reduce or eliminate the annual tax levy on property for state, city and county purposes and to reduce the levy on property for public school education. (Laws of 1982, Chapter 230, Section 17)

Yield

No monies will be collected from this tax until fiscal year 1982-83.

-continued-

Inventory Tax on Metalliferous Minerals
continued

Distribution

Of the total amount collected from the inventory tax on metalliferous minerals, 40 percent is to be distributed in the same manner as the transaction privilege tax and the balance is to be deposited in the state general fund. (Laws of 1982, Chapter 230, Section 16)

Source: State of Arizona Tax Handbook - 1983
Prepared by the Staff of the Joint Legislative Budget Committee

TABLE I

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

1983

| COMPANY/MINE | TONS COPPER ORE MINED | TONS COPPER ORE MILLED | POUNDS RECOVERABLE COPPER | POUNDS RECOVERABLE MOLYBDENUM | TONS WASTE/OVERBURDEN REMOVED |
|--|-----------------------------|------------------------------|---------------------------------|-------------------------------------|-------------------------------------|
| <u>ANAMAX MINING COMPANY</u> | | | | | |
| Eisenhower (Anamax share) <u>1/</u> | N/A | 3,126,489 | 34,902,176 <u>2/</u> | 328,077 | N/A |
| Twin Buttes <u>3/</u> | 728,598 | 4,384,607 | 63,313,377 | 266,927 | 830,461 |
| Precipitate Cu | | | (50,648,792) <u>4/</u> | | |
| Total | 728,598 | 7,511,896 | 98,215,553 | 595,004 | 830,461 |
| <u>1/ Mine down 7/31/83 - Labor dispute</u> | | | | | |
| <u>2/ Pounds copper in concentrate</u> | | | | | |
| <u>3/ Twin Buttes shut down January 28, 1983</u> | | | | | |
| <u>4/ Included in pounds recoverable copper</u> | | | | | |
| ----- | | | | | |
| <u>ASARCO, INC.</u> | | | | | |
| Eisenhower (ASARCO share) | 3,035,900 | 3,035,900 | 44,633,743 | -0- | 1,733,900 |
| Mission | 3,992,600 | 3,992,600 | 47,692,935 | -0- | 10,066,200 |
| Sacaton | 4,003,449 | 4,003,449 | 37,587,333 | -0- | 1,409,800 |
| San Xavier | 2,784,300 | 2,784,300 | 22,566,716 | -0- | 2,663,300 |
| Silver Bell <u>1/</u> | 864,500 | 864,500 | 18,021,108 | -0- | 939,980 |
| Precipitate Cu | | | (10,373,785) <u>2/</u> | | |
| Total | 14,680,749 | 14,680,749 | 170,501,835 | -0- | 16,813,180 |

1/ Mine and concentrator were shut down from Jan. thru Sept. 19832/ Included in pounds recoverable copper

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES
1983

| COMPANY/MINE | TONS COPPER ORE MINED | TONS COPPER ORE MILLED | POUNDS RECOVERABLE COPPER | POUNDS RECOVERABLE MOLYBDENUM | TONS WASTE/OVERBURDEN REMOVED |
|---------------------------------|-----------------------------|------------------------------|---------------------------------|-------------------------------------|-------------------------------------|
| <u>CYPRUS MINES CORPORATION</u> | | | | | |
| Bagdad | 19,901,000 | 19,612,000 | 162,065,000 | 2,926,000 | 30,350,000 |
| Precipitate Cu | | | (13,282,000) <u>1/</u> | | |
| Johnson | 1,962,000 | -0- | 9,717,606 | -0- | 67,700 |
| Pima <u>2/</u> | -0- | -0- | -0- | -0- | -0- |
| Total | 21,863,600 | 19,612,000 | 171,782,606 | 2,926,000 | 30,417,700 |
| <u>DUVAL CORPORATION</u> | | | | | |
| Esperanza <u>1/</u> | -0- | -0- | -0- | -0- | -0- |
| Precipitate Cu | | | 6,366,791 | | |
| Mineral Park <u>2/</u> | -0- | -0- | -0- | -0- | -0- |
| Precipitate Cu | -0- | -0- | 3,100,700 | | |
| Sierrita | 20,727,891 | 21,240,907 | 130,401,953 <u>3/</u> | 12,634,791 | 6,767,195 |
| Total | 20,727,891 | 21,240,907 | 139,869,444 | 12,634,791 | 6,767,195 |

- 1/ Mine shut-down all of 1983
2/ Mine shut-down all of 1983
3/ Pounds copper in concentrates

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

1983

| COMPANY/MINE | TONS COPPER ORE MINED | TONS COPPER ORE MILLED | POUNDS RECOVERABLE COPPER | POUNDS RECOVERABLE MOLYBDENUM | TONS WASTE/OVERBURDEN REMOVED |
|---|-----------------------------|------------------------------|--|-------------------------------------|-------------------------------------|
| <u>INSPIRATION CONSOLIDATED COPPER CO.</u> | | | | | |
| Christmas <u>1/</u> Inspiration Precipitate Cu Ox Hide <u>2/</u> | -0- 30,176,000 | -0- 7,089,000 | -0- 162,244,000 (78,988,000) <u>3/</u> | -0- 286,000 | -0- 8,265,000 |
| Total | 30,176,000 | 7,089,000 | 162,244,000 | 286,000 | 8,265,000 |

- 1/ Shut-down without production in 1983
2/ Shut-down without production in 1983
3/ Included in pounds recoverable copper

KENNECOTT CORPORATION

| | | | | | |
|---|-----------|-----------|---|---------------|-----------|
| Ray Mines Division <u>1/</u> Precipitate Cu Concentrate | 2,963,810 | 2,963,810 | -0- 20,032,825 54,162,687 <u>2/</u> | -0- <u>3/</u> | 8,065,610 |
| Total | 2,963,810 | 2,963,810 | 74,195,512 | -0- | 8,065,610 |

- 1/ Mine was shut-down January-August 1983
2/ Solvent extraction/electrowinning plant was shut-down in 1983
3/ Molybdenum plant shut-down 1983

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

1983

| COMPANY/MINE | TONS COPPER ORE MINED | TONS COPPER ORE MILLED | POUNDS RECOVERABLE COPPER | POUNDS RECOVERABLE MOLYBDENUM | TONS WASTE/OVERBURDEN REMOVED |
|----------------------------------|-----------------------------|------------------------------|---------------------------------|-------------------------------------|-------------------------------------|
| <u>MAGMA COPPER COMPANY</u> | | | | | |
| San Manuel Superior <u>1/</u> | 18,272,239 -0- | 18,207,167 -0- | 199,409,000 -0- | 3,478,259 -0- | N/A -0- |
| Total | 18,272,239 | 18,207,167 | 199,409,000 | 3,478,259 | -0- |

1/ Temporarily shut-down

NORANDA LAKESHORE MINES,
INC.

| | | | | | |
|-----------------------------|-----------|-----------|-------------------------------------|-----|-----|
| Lakeshore Precipitate Cu | 1,064,436 | 1,292,775 | 37,519,504 (3,243,975) <u>1/</u> | -0- | N/A |
| Total | 1,064,436 | 1,292,775 | 37,519,504 | -0- | -0- |

1/ Included in pounds recoverable copper

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

1983

| COMPANY/MINE | TONS COPPER ORE MINED | TONS COPPER ORE MILLED | POUNDS RECOVERABLE COPPER | POUNDS RECOVERABLE MOLYBDENUM | TONS WASTE/OVERBURDEN REMOVED |
|---|-----------------------------|------------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| <u>PHELPS DODGE CORPORATION</u> | | | | | |
| Copper Queen Branch Precipitate Cu | | | 5,200,000 | | |
| Morenci and Metcalf Precipitate Cu | 34,401,827 | 34,401,827 | 356,368,000 (69,158,000) <u>1/</u> | 523,723 | 21,988,000 |
| New Cornelia Branch <u>2/</u> Precipitate Cu | 8,023,000 | 8,023,000 | 74,600,000 | 159,584 | 2,371,047 |
| Total | 42,424,827 | 42,424,827 | 436,168,000 | 683,307 | 24,359,047 |

1/ Included in pounds recoverable copper

2/ Shut-down without production January and February 1983

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

| COMPANY/MINE | 1983 | | | | |
|---|-----------------------------|------------------------------|---------------------------------|-------------------------------------|-------------------------------------|
| | TONS COPPER ORE MINED | TONS COPPER ORE MILLED | POUNDS RECOVERABLE COPPER | POUNDS RECOVERABLE MOLYBDENUM | TONS WASTE/OVERBURDEN REMOVED |
| <u>PINTO VALLEY COPPER CORPORATION 1/</u> | | | | | |
| Copper Cities 2/ | | | | | |
| Miami (Cities Service) | | | 1,645,295 | | |
| Miami (Pinto Valley Copper Corp.) | | | 7,643,968 | | |
| Sub-total 3/ | | | 9,289,263 | | |
| Pinto Valley (Cities Service) | | | 2,458,996 | | |
| Pinto Valley (Pinto Valley Copper Corp.) | | | 12,884,249 | | |
| Sub-total 4/ | | | 15,343,245 | | |
| Total | | | 24,632,508 | | |

1/ Prior to March 1, 1983 was the Metals Division of Cities Service Co.

2/ Precipitation plant was shut-down in June 1982 and is no longer considered a production unit

3/ Miami SX-EW plant operated continuously with feed from old Miami Copper caved area

4/ Pinto Valley SX-EW plant operated continuously with feed from mine leach dumps

TABLE I
(Cont)

COPPER AND MOLYBDENUM PRODUCTION OF LARGE ARIZONA COPPER MINES

1983

| COMPANY/MINE | TONS COPPER ORE MINED | TONS COPPER ORE MILLED | POUNDS RECOVERABLE COPPER | POUNDS RECOVERABLE MOLYBDENUM | TONS WASTE/OVERBURDEN REMOVED |
|---|-----------------------------|------------------------------|---------------------------------|-------------------------------------|-------------------------------------|
| <u>RANCHERS EXPLORATION AND DEVELOPMENT CORPORATION</u> | | | | | |
| Bluebird <u>1/</u> | | | | | |
| Total | | | | | |
| <u>1/</u> Mine closed and placed on standby Oct. 25, 1982 | | | | | |
| <u>TOTAL LARGE COMPANIES</u> | 152,902,150 | 135,023,131 | 1,514,537,962 | 20,603,361 | 95,518,193 |

Source: Personal correspondence with individual companies.

TABLE II
ARIZONA LEACH COPPER PRODUCTION 1/

(Thousand Pounds)

| MINE OPERATION | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <hr/> | | | | | | | | | | |
| <u>ANAMAX MINING COMPANY</u> | | | | | | | | | | |
| Twin Buttes | -- | 13,462 | 57,925 | 68,772 | 71,614 | 70,343 | 63,719 | 67,922 | 60,796 | 50,649 |
| <u>ASARCO INCORPORATED</u> | | | | | | | | | | |
| San Xavier 2/ | 11,762 | 19,384 | 22,772 | 12,860 | 15,183 | -- | -- | -- | -- | -- |
| Silver Bell | 7,860 | 8,497 | 8,627 | 5,012 | 6,267 | 6,980 | 4,423 | 7,950 | 8,687 | 10,374 |
| <u>BIG HOLE MINING CO.</u> | | | | | | | | | | |
| United Verde | 44 | 32 | -- | -- | -- | -- | -- | -- | -- | -- |
| <u>CYPRUS MINES CORP.</u> | | | | | | | | | | |
| Bagdad | 13,508 | 14,321 | 14,606 | 15,011 | 14,097 | 14,337 | 12,668 | 13,244 | 13,173 | 13,282 |
| Johnson | -- | 6,143 | 10,060 | 10,327 | 10,205 | 10,032 | 10,302 | 10,693 | 9,702 | -- |
| <u>DUVAL CORPORATION</u> | | | | | | | | | | |
| Esperanza | 1,817 | 3,960 | 6,412 | 8,636 | 7,469 | 6,002 | 9,991 | 11,566 | 9,354 | 6,367 |
| Mineral Park | 6,801 | 6,915 | 6,817 | 5,260 | 4,813 | 3,348 | 3,690 | 4,194 | 3,191 | 3,101 |
| <u>EL PASO NATURAL GAS</u> | | | | | | | | | | |
| Emerald Isle | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| <u>INSPIRATION CONSOLIDATED</u> | | | | | | | | | | |
| <u>COPPER COMPANY</u> | | | | | | | | | (Est.) | |
| Inspiration | 47,765 | 52,470 | 45,545 | 20,883 | 35,945 | 16,638 | 28,958 | 50,532 | 50,000 | 78,988 |
| Ox Hide | 9,679 | 10,107 | 7,915 | 4,639 | 4,147 | 1,178 | 1,015 | 761 | 1,572 | -- |
| <u>KENNECOTT CORPORATION</u> | | | | | | | | | | |
| Ray 3/ | 25,478 | 24,338 | 24,374 | 24,334 | 25,013 | 26,502 | 25,875 | 25,788 | 22,420 | 20,033 |
| <u>MCALESTER FUEL COMPANY</u> | | | | | | | | | | |
| Zonia | 2,717 | 619 | -- | -- | -- | -- | -- | -- | -- | -- |

(Continued)

TABLE II
ARIZONA LEACH COPPER PRODUCTION 1/

(Thousand Pounds)

| MINE OPERATION | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| <u>NORANDA LAKESHORE MINES INC.</u> | | | | | | | | | | |
| Lakeshore | -- | -- | 28,407 | 25,031 | -- | -- | -- | 26,071 | 45,611 | 3,244 |
| <u>PHELPS DODGE CORPORATION</u> | | | | | | | | | | |
| Copper Queen Branch <u>4/</u> | 6,402 | 8,377 | 7,893 | 8,526 | 7,932 | 7,316 | 6,052 | 4,600 | 4,545 | 5,200 |
| Morenci Branch | 22,704 | 23,778 | 53,136 | 41,545 | 51,362 | 93,983 | 86,840 | 96,090 | 75,735 | 69,158 |
| New Cornelia Branch | -- | -- | -- | -- | -- | -- | -- | -- | 661 | -- |
| <u>PINTO VALLEY COPPER CORP.</u> | | | | | | | | | | |
| Copper Cities | 3,295 | 3,562 | 3,370 | 3,346 | 3,806 | 4,351 | 3,984 | 3,622 | 2,046 | -- |
| Miami | 11,969 | 13,076 | 13,509 | 11,732 | 11,703 | 12,636 | 11,184 | 10,217 | 10,301 | 9,289 |
| Pinto Valley | -- | -- | -- | -- | -- | -- | -- | 5,519 | 16,657 | 15,343 |
| <u>RANCHERS EXPLORATION & DEVELOPMENT CORPORATION</u> | | | | | | | | | | |
| Bluebird | 15,344 | 15,122 | 17,876 | 17,069 | 3,926 | 10,955 | 13,017 | 13,328 | NR | -- |
| Old Reliable | 2,175 | 467 | -- | -- | -- | 1,005 | 1,128 | 149 | -- | -- |
| TOTALS | 189,320 | 224,630 | 329,244 | 282,983 | 283,482 | 285,606 | 282,846 | 352,246 | 334,451 | 285,028 |
| PERCENT OF PRIMARY COPPER PRODUCED <u>5/</u> , <u>6/</u> | 11.0 | 13.8 | 16.1 | 15.3 | 13.9 | 13.3 | 16.4 | 15.0 | 19.6 | 18.8 |

Source: Arizona Department of Mines and Mineral Resources; This report, Table I-II.

- 1/ Copper recovered from precipitate and/or by solvent extraction from material dump, heap, vat or in-situ leached.
- 2/ San Xavier discontinued production of siliceous flux and commenced production of copper precipitate as of 5/1/73.
- 3/ Includes only copper contained in precipitates from dump leaching. Does not include copper production by electro-winning.
- 4/ Lavender Pit and Copper Queen Mine.
- 5/ Leach copper compared to total copper produced from all primary sources as reported in "Minerals Yearbook - Area Reports: Domestic", U.S. Bureau of Mines for 1973-1978.
- 6/ Leach Copper compared to total copper produced as reported in Table I for 1979-1983.

TABLE III
RANK OF ARIZONA'S COPPER COMPANIES
BY PRODUCTION OF COPPER AND MOLYBDENUM
1983

| <u>Copper 1/</u> | | | <u>Molybdenum</u> | | |
|------------------|---------------------------------|-----------------------|-------------------|---------------------------------|-----------------------|
| Rank | Company | % of AZ Production | Rank | Company | % of AZ Production |
| 1 | Phelps Dodge Corp. | 28.80 | 1 | Duval Corp. | 61.32 |
| 2 | Magma Copper Company | 13.17 | 2 | Magma Copper Company | 16.88 |
| 3 | Cyprus Mines Corp. | 11.34 | 3 | Cyprus Mines Corp. | 14.20 |
| 4 | ASARCO Inc. | 11.26 | 4 | Phelps Dodge Corp. | 3.32 |
| 5 | Inspiration Cons. Copper Co. | 10.71 | 5 | Anamax Mining Co. | 2.89 |
| 6 | Duval Corp | 9.24 | 6 | Inspiration Cons. Copper Co. | 1.39 |
| 7 | Anamax Mining Company | 6.48 | | | |
| 8 | Kennecott Corp. | 4.90 | | | |
| 9 | Noranda Lakeshore Mines Inc. | 2.48 | | | |
| 10 | Pinto Valley Copper Corp. | 1.63 | | | |
| | | <hr/> 100.00 | | | <hr/> 100.00 |

Source: Arizona Department of Mineral Resources: This Report, Table I

1/ Precipitate and/or cathode copper included in production total where applicable.

TABLE IV
RANK OF ARIZONA'S COPPER MINES
BY PRODUCTION OF COPPER AND MOLYBDENUM 1983

| RANK | <u>COPPER</u> 1/ | | <u>MOLYBDENUM</u> | |
|-------|---|--|--|--------------------------|
| | Mine/Company Copper Produced, lb. | % of Ariz. Production ^{1/} | Mine/Company Moly. Produced, lb. | % of Ariz. Production |
| 1 | Morenci-Metcalf/Phelps Dodge 356,368,000 | 23.53% | Sierrita/Duval 12,634,791 | 61.32% |
| 2 | San Manuel/Magma 199,409,000 | 13.17% | San Manuel/Magma 3,478,259 | 16.88% |
| 3 | Inspiration/Inspiration 162,244,000 | 10.71% | Bagdad/Cyprus 2,926,000 | 14.20% |
| 4 | Bagdad/Cyprus 162,065,000 | 10.70% | Morenci-Metcalf/Phelps Dodge 523,723 | 2.54% |
| 5 | Sierrita/Duval 130,401,953 | 8.61% | Eisenhower/Anamax/ASARCO 328,077 | 1.59% |
| 6 | Eisenhower/Anamax/ASARCO 79,535,919 | 5.25% | Inspiration/Inspiration 286,000 | 1.39% |
| 7 | New Cornelia (Ajo)/Phelps Dodge 74,600,000 | 4.93% | Twin Buttes/Anamax 266,927 | 1.30% |
| 8 | Ray/Kennecott 74,195,512 | 4.90% | New Cornelia (Ajo)/Phelps Dodge 159,584 | 0.77% |
| 9 | Twin Buttes/Anamax 63,313,377 | 4.18% | | |
| 10 | Mission/ASARCO 47,692,935 | 3.15% | | |
| TOTAL | 1,349,825,696 | 89.13% | 20,603,361 | 100.00% |

Source: Arizona Department of Mines & Mineral Resources; This Report, Table I
1/ Precipitate and/or cathode copper included in production total where applicable.

TABLE V
ARIZONA MINE PRODUCTION
OF RECOVERABLE COPPER IN SHORT TONS

| | 1979 | | 1980 | | 1981 | | 1982 | | 1983 | |
|-----------|----------|----------|--------|----------|---------|----------|--------|----------|--------|----------|
| | Amount | % Change | Amount | % Change | Amount | % Change | Amount | % Change | Amount | % Change |
| | BY MONTH | | | | | | | | | |
| January | 78,030 | 0.3% | 93,374 | 19.7% | 92,769 | (0.6)% | 84,559 | (8.7)% | 68,560 | (19.0)% |
| February | 77,684 | 1.3 | 86,313 | 11.1 | 88,061 | 2.0 | 82,181 | (6.7) | 54,455 | (30.1) |
| March | 87,879 | 2.3 | 96,558 | 9.9 | 94,366 | (2.3) | 90,488 | (4.1) | 66,475 | (26.5) |
| April | 89,757 | 6.4 | 93,363 | 4.0 | 95,002 | 1.8 | 87,385 | (8.0) | 61,841 | (29.2) |
| May | 92,137 | 2.8 | 95,749 | 3.9 | 97,306 | 1.6 | 73,434 | (24.5) | 63,699 | (13.3) |
| June | 84,463 | (0.6) | 85,210 | 0.9 | 93,704 | 10.0 | 67,208 | (28.3) | 65,449 | (2.6) |
| July | 82,469 | 19.7 | 36,218 | (56.1) | 95,125 | 162.6 | 60,795 | (36.1) | 54,653 | (10.1) |
| August | 92,034 | 10.2 | 25,211 | (72.6) | 101,909 | 304.2 | 56,753 | (44.3) | 52,118 | (8.2) |
| September | 86,867 | 6.7 | 25,237 | (70.9) | 98,489 | 290.3 | 55,942 | (43.2) | 64,852 | 15.9 |
| October | 96,233 | 12.2 | 49,574 | (48.5) | 103,774 | 109.3 | 61,588 | (40.7) | 64,049 | 4.0 |
| November | 89,165 | 3.9 | 75,745 | (15.1) | 102,832 | 35.8 | 68,010 | (33.9) | 69,886 | 2.8 |
| December | 86,069 | 10.7 | 86,357 | (0.3) | 83,962 | (2.8) | 60,307 | (28.2) | 65,366 | 8.4 |

CUMULATIVE YEAR TO DATE

| | | | | | | | | | | |
|-----------|-----------|------|---------|--------|-----------|--------|---------|--------|---------|---------|
| January | 78,030 | 0.3% | 93,374 | 19.7% | 92,769 | (0.6)% | 84,659 | (8.7)% | 68,560 | (19.0)% |
| February | 155,714 | 0.8 | 179,687 | 15.4 | 180,830 | 0.6 | 166,840 | (7.7) | 126,015 | (24.5) |
| March | 243,593 | 1.4 | 276,245 | 13.4 | 275,196 | (0.4) | 257,328 | (6.5) | 192,490 | (25.2) |
| April | 333,350 | 2.7 | 369,608 | 10.9 | 370,198 | 0.2 | 344,713 | (6.9) | 254,331 | (26.2) |
| May | 425,487 | 2.7 | 465,357 | 9.4 | 467,504 | 0.5 | 418,147 | (10.6) | 318,030 | (23.9) |
| June | 509,950 | 2.1 | 550,567 | 8.0 | 561,208 | 1.9 | 485,355 | (13.5) | 383,479 | (21.0) |
| July | 592,419 | 4.3 | 586,785 | (1.0) | 656,333 | 11.9 | 546,150 | (16.8) | 438,132 | (19.8) |
| August | 684,453 | 5.0 | 611,996 | (10.6) | 758,242 | 23.9 | 602,903 | (20.5) | 490,250 | (18.7) |
| September | 771,320 | 5.2 | 637,233 | (17.4) | 856,731 | 34.4 | 658,845 | (23.1) | 555,102 | (15.7) |
| October | 867,553 | 5.9 | 686,807 | (20.8) | 960,505 | 39.9 | 720,433 | (25.0) | 619,151 | (14.1) |
| November | 956,718 | 5.7 | 762,552 | (20.3) | 1,063,337 | 39.4 | 788,443 | (25.9) | 689,037 | (12.6) |
| December | 1,042,787 | 6.1 | 848,909 | (18.6) | 1,147,299 | 35.1 | 848,750 | (26.0) | 754,403 | (11.1) |

| | | | | | | | | | | |
|---------------|--------|------|--------|---------|--------|-------|--------|---------|--------|--------|
| Average Month | 86,899 | 6.1% | 70,742 | (18.6)% | 95,608 | 35.2% | 70,729 | (26.0)% | 62,867 | (11.1) |
|---------------|--------|------|--------|---------|--------|-------|--------|---------|--------|--------|

NOTE: Percentage change column shows change from corresponding period in prior year. Parentheses indicate a negative change.

Source: U.S. Department of the Interior, Bureau of Mines

Prepared by: JLBC Staff

Date: March 21, 1984

TABLE VI

AVERAGE COPPER CONTENT OF ORE PRODUCED AT ARIZONA COPPER MINES

(Percent Total Copper)

| MINE OPERATION | | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|--|----------|------|------|-------|-------|------|--------|------|------|------|-------|-------|
| <u>ANAMAX MINING COMPANY 3/</u> | | | | | | | | | | | | |
| Twin Buttes | Sulfide | 0.82 | 0.63 | 0.60 | 1.12 | 1.11 | 1.26 | .94 | .82 | .74 | .78 | .67 |
| | Oxide | -- | -- | 1.27 | 1.31 | 1.30 | 1.26 | 1.27 | 1.26 | 1.20 | 1.06 | .93 |
| <u>ASARCO INCORPORATED</u> | | | | | | | | | | | | |
| Mission | Sulfide | .60 | .61 | .60 | .62 | .58 | .59 | .60 | .75 | .75 | (.75) | (.75) |
| Sacaton | Sulfide | -- | .63 | .74 | .71 | .70 | .67 | .68 | -- | -- | -- | -- |
| San Xavier | Sulfide | -- | -- | -- | -- | -- | -- | .80 | .65 | .65 | (.65) | (.51) |
| | Oxide 4/ | .61 | .77 | 1.05 | 1.12 | -- | -- | -- | -- | -- | -- | -- |
| Silver Bell | Sulfide | .64 | .65 | .72 | .72 | .65 | .65 | -- | -- | -- | -- | -- |
| <u>CITIES SERVICE CO./PINTO VALLEY CORP.</u> | | | | | | | | | | | | |
| Miami East | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Pinto Valley | Sulfide | -- | -- | (.45) | (.45) | .49 | .52 | .49 | .49 | .46 | .46 | -- |
| <u>CYPRUS MINES CORPORATION</u> | | | | | | | | | | | | |
| Bagdad | Sulfide | .70 | .74 | .70 | .60 | .59 | .52 | .50 | .50 | .50 | .50 | .50 |
| Bruce | Sulfide | 3.68 | 3.86 | 3.73 | 3.54 | 3.97 | closed | -- | -- | -- | -- | -- |
| Johnson | Oxide 1/ | -- | -- | .42 | .42 | .46 | .44 | .40 | .40 | .40 | .40 | .40 |
| Pima | Sulfide | .51 | .50 | .48 | .47 | .48 | -- | .46 | .49 | .49 | .48 | -- |
| <u>DUVAL CORPORATION</u> | | | | | | | | | | | | |
| Esperanza | Sulfide | .34 | .31 | -- | .29 | .29 | -- | -- | .32 | .29 | .29 | -- |
| Mineral Park | Sulfide | .38 | .36 | .30 | .28 | .28 | .26 | .24 | .24 | .32 | -- | -- |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sierrita | Sulfide | .28 | .29 | .33 | .35 | .34 | .33 | .34 | .34 | .30 | .30 | (.30) |
| <u>INSPIRATION CONSOLIDATED COPPER CO.</u> | | | | | | | | | | | | |
| Christmas (OP) | Sulfide | .74 | .57 | .57 | .58 | .74 | -- | .74 | .73 | .62 | .62 | -- |
| Inspiration Area | Sulfide | .67 | .63 | .65 | .63 | .70 | .61 | .854 | .58 | .58 | .58 | .525 |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Ox Hide | Oxide 1/ | -- | -- | .29 | .27 | .27 | -- | -- | -- | -- | -- | -- |

(Continued)

TABLE VI

AVERAGE COPPER CONTENT OF ORE PRODUCED AT ARIZONA COPPER MINES

(Percent Total Copper)

| MINE OPERATION | | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|-------------------|------|------|-------|-------|-------|------|------|------|------|------|---------------|
| <u>KENNECOTT CORPORATION</u> | | | | | | | | | | | | |
| Ray <u>5/</u> | Sulfide | .91 | .83 | .90 | .86 | .921 | .856 | .876 | .910 | .969 | .80 | 1.187 |
| | Oxide (Silicate) | 1.35 | 1.19 | 1.231 | 1.15 | -- | -- | -- | -- | -- | -- | -- |
| <u>MAGMA COPPER COMPANY</u> | | | | | | | | | | | | |
| San Manuel | Sulfide <u>2/</u> | -- | .70 | .64 | (.7) | (.7) | .64 | .63 | .65 | .635 | .66 | 0.64 |
| Superior | Sulfide | -- | -- | (4.5) | (4.5) | (4.5) | 4.36 | 4.41 | 4.32 | 4.48 | 4.32 | -- |
| <u>MCALESTER FUEL COMPANY</u> | | | | | | | | | | | | |
| Zonia | Oxide | -- | -- | (.53) | -- | -- | -- | -- | -- | -- | -- | -- |
| <u>NORANDA LAKESHORE MINES INC.</u> | | | | | | | | | | | | |
| Lakeshore <u>6/</u> | Sulfide | -- | -- | -- | .75 | .91 | -- | -- | -- | -- | -- | -- |
| | Oxide <u>1/</u> | -- | -- | -- | 1.03 | .93 | -- | -- | -- | 1.00 | 1.00 | (1.00) |
| <u>PHELPS DODGE CORPORATION</u> | | | | | | | | | | | | |
| Copper Queen | Sulfide | 4.06 | 3.48 | 5.70 | -- | -- | -- | -- | -- | -- | -- | -- |
| Lavender | Sulfide | .60 | .47 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Metcalf | Sulfide | -- | -- | .84 | .86 | .70 | .79 | .78 | .69 | -- | .78 | .73 <u>8/</u> |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Morenci | Sulfide | .82 | .82 | .79 | .80 | .81 | .80 | .72 | .82 | .74 | .72 | .73 <u>8/</u> |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| New Cornelia | Sulfide | .61 | .57 | .57 | .66 | .64 | .59 | .53 | .51 | .50 | .64 | .60 |
| <u>RANCHERS EXPLORATION & DEVELOPMENT CORPORATION</u> | | | | | | | | | | | | |
| Bluebird | Oxide | -- | -- | .48 | .58 | .79 | .70 | .40 | .40 | .40 | -- | -- |
| <u>WEIGHTED AVERAGE SULFIDE GRADE <u>7/</u></u> | | | | | | | | | | | | |
| | | .60 | .57 | .56 | .61 | .57 | .61 | .64 | .58 | .58 | .59 | .65 |

Source: Company annual reports, Form 10-K's and Prospectus; "International Directory of Mining and Mineral Processing Operations", E&MJ; Arizona Department of Mines & Mineral Resources.

() Percentage in parenthesis is approximate: not used in calculation of weight average.

(Continued)

TABLE VI

- 1/ Acid soluble copper.
- 2/ Sulfide copper.
- 3/ Included ANAMAX share of Palo Verde deposit for 1979-1982.
- 4/ Copper bearing silica flux mined 1971-1972.
- 5/ Grade reported for Kennecott's Ray mine is an average of oxide and sulfide together for 1977 to 1982.
- 6/ The Lakeshore mine was owned and operated by the Hecla Mining Company in 1976 and 1977.
- 7/ Weighted average grade of ore milled, based generally on an assay of total copper.
- 8/ Based on combined Metcalf and Morenci mines production.

TABLE VII
PERCENT CONTAINED COPPER RECOVERED AT ARIZONA COPPER MINES 1/

(Percent of Total Copper)

| MINE OPERATION | | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|-----------------|------|------|------|------|------|--------|------|------|-------|-------|-----------|
| <u>ANAMAX MINING COMPANY</u> | | | | | | | | | | | | |
| Twin Buttes <u>5/</u> | Sulfide | 72 | 71 | 63 | 68 | 87 | 76 | 85 | 87 | 85 | -- | -- |
| | Oxide | -- | -- | 65 | 75 | 76 | 79 | 78 | 76 | 77 | -- | -- |
| | | | | | | | | | | Total | 87 | (80 est.) |
| <u>ASARCO INCORPORATED</u> | | | | | | | | | | | | |
| Mission | Sulfide | 88 | 88 | 88 | 89 | 87 | 87 | 75 | 87 | 94 | 85 | 80 |
| Sacaton | Sulfide | -- | 78 | 82 | 82 | 82 | 83 | 78 | -- | -- | -- | -- |
| San Xavier | Sulfide | -- | -- | -- | -- | -- | -- | 82 | 66 | 76 | 78 | 79 |
| | Oxide | 49 | 63 | 67 | 77 | -- | -- | -- | -- | -- | -- | -- |
| Silver Bell | Sulfide | 80 | 78 | 77 | 81 | 78 | 78 | -- | -- | -- | -- | -- |
| <u>CITIES SERVICE COMPANY/PINTO VALLEY COPPER CORP.</u> | | | | | | | | | | | | |
| Pinto Valley | Sulfide | -- | -- | -- | -- | 92 | 89 | 84 | 83 | 94 | 95 | -- |
| <u>CYPRUS MINES CORPORATION</u> | | | | | | | | | | | | |
| Bagdad | Sulfide | 82 | 77 | 81 | 86 | 73 | 83 | 80 | 76 | 94 | 83 | 83 |
| Bruce | Sulfide | 90 | 90 | 93 | 92 | 88 | closed | -- | -- | -- | -- | -- |
| Johnson | Oxide <u>2/</u> | -- | -- | 43 | 91 | 90 | 96 | 79 | 86 | 86 | -- | 62 |
| Pima | Sulfide | 85 | 85 | 82 | 84 | 79 | -- | 76 | 84 | 76 | 89 | -- |
| <u>DUVAL CORPORATION</u> | | | | | | | | | | | | |
| Esperanza | Sulfide | 87 | 89 | 90 | 91 | 85 | -- | -- | 90 | 87 | -- | -- |
| Mineral Park | Sulfide | 81 | 72 | 81 | 73 | 75 | 76 | 73 | 84 | 75 | -- | -- |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sierrita | Sulfide | 90 | 89 | 90 | 88 | 88 | 91 | 87 | 86 | 80 | 98(?) | (88 est.) |
| <u>INSPIRATION CONSOLIDATED COPPER CO.</u> | | | | | | | | | | | | |
| Christmas (OP) | Sulfide | 66 | 70 | 73 | 77 | 74 | -- | -- | 70 | 71 | -- | -- |
| Inspiration Area <u>3/</u> | Sulfide | 45 | 48 | 46 | 45 | 54 | 55 | 53 | 81 | 74 | 68 | 86 |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Ox Hide | Oxide <u>2/</u> | -- | -- | 76 | 67 | 56 | -- | -- | -- | -- | -- | -- |

(Continued)

TABLE VII

PERCENT CONTAINED COPPER RECOVERED AT ARIZONA COPPER MINES
(Percent of Total Copper)

| MINE OPERATION | | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|-------------------|-----------------------|------|------|------|------|------|------|------|---------------|-----------|--------------|
| <u>KENNECOTT CORPORATION</u> | | | | | | | | | | | | |
| Ray | Sulfide | -- | -- | -- | -- | -- | -- | -- | -- | 7 | 70 | (70 est.) |
| <u>MAGMA COPPER COMPANY</u> | | | | | | | | | | | | |
| San Manuel | Sulfide <u>4/</u> | -- | 90 | 87 | -- | -- | 85 | 83 | 95 | 87 | 89 | 86 |
| Superior | Sulfide | -- | -- | -- | -- | -- | 90 | 91 | 95 | 93 | (93 est.) | -- |
| <u>MCALESTER FUEL COMPANY</u> | | | | | | | | | | | | |
| Zonia | Oxide | In-situ Leach 1973-75 | | | | | | | | | | |
| <u>NORANDA LAKESHORE MINES INC.</u> | | | | | | | | | | | | |
| Lakeshore | Sulfide | -- | -- | -- | 100 | 99 | -- | -- | -- | -- | -- | -- |
| | Oxide <u>2/</u> | -- | -- | -- | 98 | 100 | -- | -- | -- | 92 | -- | -- |
| <u>PHELPS DODGE CORP.</u> | | | | | | | | | | | | |
| Copper Queen | Sulfide | 90 | 90 | 92 | -- | -- | -- | -- | -- | -- | -- | -- |
| Lavender | Sulfide | 67 | 52 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Metcalf | Sulfide | -- | -- | 63 | 54 | 56 | 61 | 59 | 58 | -- | -- | -- |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Morenci | Sulfide | 71 | 74 | 70 | 70 | 72 | 77 | 68 | 64 | 69 | 68 | 71 <u>7/</u> |
| | Oxide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| New Cornelia | Sulfide | 85 | 85 | 80 | 80 | 82 | 84 | 80 | 79 | 78 | 85 | 78 |
| <u>RANCHERS EXPLORATION & DEVELOPMENT CORPORATION</u> | | | | | | | | | | | | |
| Bluebird | Oxide | -- | -- | 34 | 36 | 38 | 85 | 36 | 41 | 156 <u>6/</u> | -- | -- |

Source: Company Annual Reports and Form 10-K's, E & MJ International Directory; Arizona Dept. of Mines & Mineral Resources.

- 1/ Recoveries are based on available reported production and average grade of material treated. A number of oxide operations are not listed because of inadequate data.
- 2/ Percent recovery of acid soluble copper.
- 3/ Percent recovery in flotation-concentration treatment, after ore has been leached for 1971-1979.
- 4/ Percent recovery of sulfide copper.
- 5/ Recovery includes ANAMAX's share of Palo Verde 1979-1981-1982-1983.
- 6/ Recovery by leaching heaps continued after mining was terminated in July 1981.
- 7/ Includes Metcalf production.

TABLE VIII
STRIPPING RATIOS AT ARIZONA OPEN-PIT COPPER MINES 1/
(Waste:Ore)

| MINE OPERATION | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|--------|---------|------------------|--------|--------|--------|--------|--------|--------|--------------|--------------|
| <u>ANAMAX MINING COMPANY</u> | | | | | | | | | | | |
| Twin Buttes | 7.60:1 | 10.80:1 | 1.60:1 <u>5/</u> | 5.50:1 | 5.60:1 | 2.00:1 | 2.90:1 | 3.32:1 | 3.62:1 | 2.05:1 | 1.14:1 |
| <u>ASARCO INCORPORATED</u> | | | | | | | | | | | |
| Eisenhower <u>5/</u> | -- | -- | -- | -- | -- | -- | -- | -- | .71:1 | .67:1 | 0.57:1 |
| Mission | 2.50:1 | 2.30:1 | 1.50:1 | 1.50:1 | 2.30:1 | 2.30:1 | 0.76:1 | 3.05:1 | 2.01:1 | 1.62:1 | 2.52:1 |
| Sacaton | -- | -- | 6.30:1 | 5.90:1 | 4.40:1 | 2.70:1 | 3.10:1 | 2.02:1 | 1.30:1 | .70:1 | 0.35:1 |
| San Xavier | -- | -- | -- | 5.10:1 | 5.00:1 | 1.10:1 | 1.10:1 | 6.01:1 | 6.18:1 | 2.90:1 | 0.96:1 |
| Silver Bell | 3.50:1 | 3.40:1 | 2.00:1 | 1.60:1 | 1.80:1 | 1.40:1 | 1.50:1 | -- | 1.41:1 | -- | 1.09:1 |
| <u>CITIES SERVICE CO./PINTO VALLEY COPPER CORP.</u> | | | | | | | | | | | |
| Pinto Valley | -- | -- | 1.80:1 | 1.70:1 | 1.70:1 | 1.60:1 | 1.80:1 | 1.07:1 | 1.77:1 | 1.80:1 | -- <u>9/</u> |
| <u>CYPRUS MINES CORPORATION</u> | | | | | | | | | | | |
| Bagdad | 5.20:1 | 4.50:1 | 1.20:1 | 9.80:1 | 7.80:1 | 1.70:1 | 1.80:1 | 1.52:1 | 1.78:1 | 1.45:1 | 1.53:1 |
| Johnson | -- | -- | 0.56:1 | 1.50:1 | 1.60:1 | 2.50:1 | 1.30:1 | 2.01:1 | 1.52:1 | -- <u>8/</u> | 0.03:1 |
| Pima | 1.60:1 | 2.80:1 | 2.00:1 | 2.00:1 | 1.60:1 | -- | 5.20:1 | 6.28:1 | 3.06:1 | 1.42:1 | -- <u>9/</u> |
| <u>DUVAL CORPORATION</u> | | | | | | | | | | | |
| Esperanza | 1.50:1 | 1.50:1 | 0.71:1 | 1.10:1 | 1.10:1 | -- | 1.30:1 | 0.76:1 | 1.95:1 | -- | -- <u>9/</u> |
| Mineral Park | 0.66:1 | 0.90:1 | 0.66:1 | 2.10:1 | 1.60:1 | 1.50:1 | 1.70:1 | 1.71:1 | 1.44:1 | -- | -- <u>9/</u> |
| Sierrita | 1.50:1 | 1.70:1 | 1.40:1 | 1.50:1 | 1.60:1 | 1.30:1 | 1.10:1 | 1.11:1 | .98:1 | .55:1 | 0.33:1 |
| <u>INSPIRATION CONSOLIDATED</u> | | | | | | | | | | | |
| <u>COPPER COMPANY</u> | | | | | | | | | | | |
| Christmas | 5.80:1 | 5.10:1 | 3.40:1 | 3.10:1 | 4.40:1 | -- | -- | 4.40:1 | 3.24:1 | -- | -- <u>9/</u> |
| Inspiration Area | 1.90:1 | 2.20:1 | 3.10:1 | 1.90:1 | 2.40:1 | 2.80:1 | 3.40:1 | 2.40:1 | 1.53:1 | 1.42:1 | 0.27:1 |
| Ox Hide | .028:1 | 0.32:1 | 0.38:1 | 0.38:1 | 0.20:1 | -- | -- | -- | -- | -- | -- |
| <u>KENNECOTT CORPORATION</u> | | | | | | | | | | | |
| Ray | 2.60:1 | 3.00:1 | 3.50:1 | 2.60:1 | 2.50:1 | 3.10:1 | 2.70:1 | 3.15:1 | 1.88:1 | 2.30:1 | 2.72:1 |

(Continued)

TABLE VIII

STRIPPING RATIOS AT ARIZONA OPEN-PIT COPPER MINES ^{1/}
(WASTE:ORE)

| MINE OPERATION | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|----------------------|--------|----------------------|--------|--------|--------|--------|----------------------|----------------------|--------|-----------------------|
| <u>PHELPS DODGE CORPORATION</u> | | | | | | | | | | | |
| Lavender | 1.10:1 | 0.83:1 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Metcalf | -- | -- | 2.80:1 | 1.80:1 | 1.80:1 | 1.50:1 | 2.30:1 | 1.67:1 | -- | -- | -- |
| Morenci | 1.90:1 | 2.00:1 | 1.80:1 | 1.30:1 | 1.50:1 | 1.50:1 | 1.40:1 | 1.30:1 | 1.63:1 | .79:1 | 0.64:1 ^{10/} |
| New Cornelia | 1.90:1 | 1.50:1 | 1.50:1 | 1.10:1 | 1.10:1 | 1.40:1 | 1.00:1 | 2.27:1 ^{2/} | .48:1 ^{2/} | 1.21:1 | 0.30:1 |
| <u>RANCHERS EXPLORATION & DEVELOPMENT CORPORATION</u> | | | | | | | | | | | |
| Bluebird | 1.00:1 ^{7/} | 1.30:1 | 1.30:1 | 1.80:1 | 3.30:1 | 1.50:1 | 1.50:1 | 1.50:1 | .003:1 ^{6/} | -- | -- |
| WEIGHTED AVERAGE* | 2.51:1 | 2.70:1 | 3.03:1 ^{4/} | 1.79:1 | 2.21:1 | 1.75:1 | 1.75:1 | 1.90:1 | 1.57:1 | 1.31:1 | 0.57:1 |

Source: "Minerals Yearbook - Area Reports: Domestic", U.S. Bureau of Mines; Company Annual Reports: EMJ International Directory of Mining and Mineral Processing Operations; Arizona Department of Mines and Mineral Resources; Company submitted data for 1983.

^{1/} Leachable rock included with waste (except at solely leach operations).

^{2/} Includes preproduction stripping.

^{3/} Stripping continued as sulfide concentrator was shut down from March 1975 to January 1976.

^{4/} Without Twin Buttes the ratio would be 1.89:1.

^{5/} Mining is done by ASARCO, includes ANAMAX's share of ore.

^{6/} Stripping of overburden ceased in January but mining continued until July.

^{7/} Not used in calculation of weighted average.

^{8/} No stripping in 1982.

^{9/} No stripping in 1983.

^{10/} Combined Morenci and Metcalf.

*NOTE: These are now weighted averages so use caution in making comparisons to the averages presented in previous editions of this report.

TABLE IX

ARIZONA PRODUCTION AND VALUE OF COPPER, MOLYBDENUM, GOLD AND SILVER

RECOVERED FROM COPPER ORE

| Year | Copper Ore <u>1/</u> Tons | Gold <u>2/</u> Troy Ounces Value <u>5/</u> | Silver <u>2/</u> Troy Ounces Value <u>6/</u> | Molybdenum <u>3/</u> 1,000 lbs. Value (in \$1,000) | Copper <u>4/</u> Pounds Value | Copper <u>4/</u> Lbs. Cu/ton ore Ave.¢/lb. <u>7/</u> | Value of Copper Gold, Silver & Molybdenum |
|---------|------------------------------|--|--|---|-------------------------------------|--|--|
| 1970 | 150,240,842 | 107,292 \$3,904,400 | 7,130,261 \$12,626,700 | 15,672 \$26,700 | 1,694,294,000 \$ 977,608,000 | 11.28 57.700 | \$1,020,839,100 |
| 1971 | 149,293,547 | 93,617 \$3,820,510 | 6,106,204 \$ 9,437,479 | 22,684 \$39,872 | 1,529,780,500 \$ 786,812,004 | 9.76 51.433 | \$ 839,942,263 |
| 1972 | 165,914,825 | 102,526 \$5,987,518 | 6,614,957 \$11,143,226 | 27,126 \$46,791 | 1,695,858,000 \$ 858,392,446 | 10.22 50.617 | \$ 922,314,190 |
| 47 1973 | 181,311,945 | 102,376 \$10,013,397 | 7,164,988 \$18,325,173 | 37,657 \$59,372 | 1,735,012,000 \$1,021,314,814 | 9.57 58.865 | \$1,109,025,384 |
| 1974 | 178,913,296 | 90,206 \$14,488,424 | 6,308,721 \$29,701,332 | 28,346 \$57,067 | 1,609,808,000 \$1,233,901,735 | 9.00 76.649 | \$1,335,158,491 |
| 1975 | 168,750,152 | 82,759 \$13,364,751 | 6,190,805 \$27,354,196 | 25,030 \$61,411 | 1,502,978,000 \$ 954,917,072 | 8.91 63.535 | \$1,057,047,019 |
| 1976 | 194,136,559 | 97,961 \$12,276,473 | 7,308,395 \$31,816,805 | 31,073 \$89,148 | 1,912,430,000 \$1,316,210,823 | 9.85 68.824 | \$1,449,452,101 |
| 1977 | 168,641,401 | 87,874 \$13,032,593 | 6,696,415 \$30,957,660 | 34,574 \$120,497 | 1,705,240,000 \$1,122,184,339 | 10.11 65.808 | \$1,166,295,089 |
| 1978 | 178,204,491 | 92,508 \$17,905,108 | 6,611,781 \$35,709,502 | 33,029 \$150,142 | 1,817,670,000 \$1,190,755,617 | 10.20 65.510 | \$1,244,520,369 |
| 1979 | 203,977,408 | 99,549 \$30,622,766 | 7,454,306 \$82,699,941 | 35,101 \$213,065 | 1,914,501,095 \$1,767,735,441 | 9.39 92.334 | \$2,094,081,895 |

-continued-

TABLE IX
ARIZONA PRODUCTION AND VALUE OF COPPER, MOLYBDENUM, GOLD AND SILVER
RECOVERED FROM COPPER ORE

| Year | Copper Ore 1/ Tons | Gold 2/ Troy Ounces Value 5/ | Silver 2/ Troy Ounces Value 6/ | Molybdenum 3/ 1,000 lbs. Value (in \$1,000) | Copper 4/ Pounds Value | Copper 4/ LBS. Cu/ton ore Ave. ¢/lb. 7/ | Value of Copper Gold, Silver & Molybdenum |
|------|-----------------------|------------------------------------|--------------------------------------|--|----------------------------------|---|--|
| 1980 | 169,650,401 | 71,533 \$43,814,606 | 5,640,703 \$116,376,559 | 36,299 \$324,150 | 1,521,850,812 \$1,543,400,219 | 8.97 101.416 | \$2,027,741,384 |
| 1981 | 216,787,430 | 95,496 \$43,891,299 | 7,565,368 \$ 79,575,340 | 35,600 \$273,052 | 2,143,898,000 \$1,795,385,941 | 9.89 83.744 | \$2,191,904,580 |
| 1982 | 146,124,870 | 61,050 \$22,949,000 | 6,301,000 \$ 50,090,000 | 22,099 \$100,673 | 1,697,500,000 \$1,261,415,000 | 11.62 74.31 | \$1,435,127,000 |
| 1983 | 152,902,150 | 61,991 \$26,284,000 | 4,492,000 \$ 51,383,000 | 23,934 \$ 79,459 | 1,495,208,000 \$1,144,285,000 | 9.78 76.53 | \$1,301,411,000 |

48 Source: "Mineral Yearbook - Area Reports: Domestic", U.S. Bureau of Mines.

1/ Includes some copper-zinc, copper-lead, and/or lead-zinc ore in 1972 and thereafter.

2/ Excludes gold and silver recovered from vat or heap leaching of copper ores and from copper tailings or copper cleanup in 1969 and thereafter.

3/ Molybdenum content of recovered concentrate.

4/ Excludes precipitate copper from dump and in-place leaching prior to 1982.

5/ At average annual domestic, free market gold price in 1970 and thereafter: 1970, \$36.39; 1971, \$40.81; 1972, \$58.40; 1973, \$97.81; 1974, \$159.73; 1975, \$161.49; 1976, \$125.32; 1977, \$148.31; 1978, \$193.55; 1979, \$307.615; 1980, \$612.509; 1981, \$459.614; 1982, \$375.905; 1983, \$423.997.

6/ At E&MJ average annual N.Y. market price for .999 fine silver.

7/ At E&MJ average annual price, domestic FOB refinery.

TABLE X
ARIZONA MINE PRODUCTION (RECOVERABLE) OF GOLD, SILVER, COPPER AND LEAD IN 1983
BY CLASS OF ORE OR OTHER SOURCE MATERIAL

| SOURCE | No. of mines <u>1/</u> | Material sold or treated (Short tons) | Gold (Troy ounces) | Silver (Troy ounces) | Copper (Short tons) | Lead (Short tons) |
|----------------------|---------------------------|---|--------------------------|----------------------------|---------------------------|-------------------------|
| Lode ore: | | | | | | |
| Gold <u>2/</u> | 1 | 49,999 | 1,750 | 7,000 | -- | -- |
| Gold-Silver | 2 | W | W | W | W | W |
| Silver | 7 | W | W | W | W | W |
| Total | <u>10</u> | <u>W</u> | <u>W</u> | <u>278,887 <u>2/</u></u> | <u>W</u> | <u>W</u> |
| Copper | 17 | 134,640,683 | 54,534 | 4,131,928 | 685,239 <u>3/</u> | 63 |
| Total | <u>17</u> | <u>134,640,683</u> | <u>54,534</u> | <u>4,131,928</u> | <u>685,239</u> | <u>63</u> |
| Other lode material: | | | | | | |
| Gold-silver tailings | -- | W | W | W | W | W |
| Silver tailings | -- | W | W | W | -- | -- |
| Copper precipitates | 5 | 83,563 | -- | -- | 56,439 | -- |
| Copper tailings | 1 | W | -- | -- | W | -- |
| Total | <u>6</u> | <u>W</u> | <u>W</u> | <u>80,717 <u>2/</u></u> | <u>W</u> | <u>W</u> |
| Total lode | <u>27</u> | <u>135,301,652 <u>2/</u></u> | <u>W</u> | <u>4,491,532 <u>2/</u></u> | <u>747,604 <u>2/</u></u> | <u>159 <u>2/</u></u> |
| Placer | 1 | -- | W | -- | -- | -- |
| GRAND TOTAL | 28 | 135,301,652 <u>2/</u> | 61,991 <u>2/</u> | 4,491,532 <u>2/</u> | 747,604 <u>2/</u> | 159 <u>2/</u> |

(Continued)

TABLE X
(Continued)

Source: "Minerals Yearbook - Area Reports; Domestic 1983", U.S. Bureau of Mines (Preliminary Data)

W Withheld to avoid disclosing company proprietary data.

1/ Detail may not add to totals shown because some mines produce more than one class of material. Operations from which metals are recovered only from tailings or precipitates are not counted as producing mines.

2/ Includes items indicated by symbol W.

3/ Includes copper recovered from precipitates of ore leached.

TABLE XI
NONFUEL MINERAL PRODUCTION IN ARIZONA 1/

| MINERAL | 1982 | | 1983 P | |
|---|-----------|---------------------|-----------|---------------------|
| | Quantity | Value (thousand) | Quantity | Value (thousand) |
| Clays-----thousand short tons----- | 143 | \$ 998 | 151 | \$ 1,425 |
| Copper (recoverable content of ores, etc.) short tons---- | 848,251 R | 1,235,055 R | 747,604 | 1,144,285 |
| Gem stones----- | NA | 2,800 | NA | 2,800 |
| Gold (recoverable content of ores, etc.) troy ounces----- | 61,050 | 22,949 | 61,991 | 26,284 |
| Gypsum-----thousand short tons----- | 175 | 1,205 | 265 | 1,929 |
| Lead (recoverable content of ores, etc.) short tons----- | 396 | 202 | 159 | 69 |
| Lime-----thousand short tons----- | 326 | 77,080 | 340 | 16,700 |
| Molybdenum (content of concentrate) thousand pounds----- | 20,445 R | 89,928 R | 23,934 | 79,459 |
| ¹⁵ Pumice-----thousand short tons----- | 1 | 7 | 2 | 15 |
| Sand and gravel-----do----- | 19,231 | 59,992 | 23,200 | 75,000 |
| Silver (recoverable content of ores, etc.) thousand troy ounces----- | 6,309 R | 50,159 R | 4,492 | 51,383 |
| Stone: | | | | |
| Crushed-----thousand short tons----- | 5,200 | 22,200 | 4,755 | 24,079 |
| Dimension-----do----- | W | 580 | <u>2/</u> | 1 |
| Combined value of cement (masonry & portland), perlite, pyrites, salt, and values indicated by symbol W. | XX | 79,105 | XX | 87,449 |
| Total | XX | \$1,582,260 R | XX | \$1,510,878 |

Source: "The Mineral Industry of Arizona", Minerals Yearbook U.S. Bureau of Mines, 1983.

P Preliminary

R Revised

NA Not Available

W Withheld to avoid disclosing company proprietary data; value included in "Combined Value" figure.

XX Not Applicable.

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

2/ Less than $\frac{1}{2}$ unit.

TABLE XII

COPPER MINE CAPACITY IN ARIZONA 1/
(Short tons of Recoverable Copper/Year)

| <u>OPERATOR</u> | <u>MINE</u> | <u>CAPACITY</u> |
|-----------------------------|-----------------------|-----------------------|
| Phelps Dodge | Morenci | 155,000 |
| Anamax | Twin Buttes | 135,000 ^{2/} |
| Magma | San Manuel | 130,000 |
| Kennecott | Ray | 114,000 |
| Duval | Sierrita | 102,000 |
| Cities Service/Pinto Valley | Pinto Valley | 85,000 |
| Cyprus | Bagdad | 76,000 |
| Phelps Dodge | Metcalf | 65,000 |
| Inspiration | Inspiration Area | 55,000 |
| Phelps Dodge | New Cornelia | 45,000 |
| Cyprus | Pima | 45,000 |
| Magma | Superior (Magma) | 42,500 |
| ASARCO ^{3/} | Mission | 35,000 |
| ASARCO | Silver Bell | 23,500 |
| Duval | Esperanza | 22,500 |
| ASARCO | Sacaton | 22,000 |
| Noranda | Lakeshore | 21,000 |
| Duval | Mineral Park | 17,000 |
| ASARCO ^{3/} | Eisenhower | 13,000 |
| ASARCO ^{3/} | San Xavier | 9,000 |
| Inspiration | Christmas | 8,500 |
| Ranchers | Bluebird | 8,000 |
| Cities Service/Pinto Valley | Miami | 6,000 |
| Cyprus | Johnson | 5,500 |
| Phelps Dodge | Copper Queen/Lavender | 3,500 |
| Inspiration | Ox Hide | 2,500 |
| Cities Service/Pinto Valley | Copper Cities | 2,000 |
| TOTAL | | 1,248,500 |

Source: Arizona Department of Mines & Mineral Resources file data;
Company Annual Reports and Form 10-K; Professional
Publications.

- ^{1/} Figures generally represent a current estimate of the productive capacity of primary recoverable copper in concentrates, precipitates, and cathodes. Figures do not represent smelter or refinery capacity. The estimates are based on recent production figures and on capacities of concentrator and leach plant facilities. Other factors affecting actual production include, for example, grade of ore and recovery. Some capacities have been published by the reporting company.
- ^{2/} Includes approximately 33,000 tons of copper concentrated annually from ore obtained at the Eisenhower mine.
- ^{3/} The Mission mill treats ore from the Mission, San Xavier and ASARCO's share of Eisenhower mine production.

TABLE XIII
MINE PRODUCTION OF RECOVERABLE COPPER IN THE UNITED STATES
(Short Tons)

| <u>STATE</u> | <u>1982</u> | <u>Rank In 1982</u> | <u>1983</u> | <u>Rank In 1983</u> |
|------------------------|---------------|-------------------------|----------------|-------------------------|
| ARIZONA | 842,650 | 1 | 755,446 | 1 |
| IDAHO | 3,491 | 6 | 3,928 | 5 |
| MISSOURI | 8,976 | 5 | 8,581 | 4 |
| MONTANA | 70,667 | 4 | 37,577 | 3 |
| NEW MEXICO | 81,421 | 3 | <u>1/</u> | <u>1/</u> |
| UTAH | 206,925 | 2 | 187,062 | 2 |
| OTHER STATES <u>1/</u> | <u>39,405</u> | | <u>160,085</u> | |
| TOTAL | 1,253,535 | | 1,152,679 | |

Source: American Bureau of Metal Statistics, Inc. Non-Ferrous Metal Data 1983, p. 25. Derived from U. S. Bureau of Mines data.

1/ Includes California, Colorado, Maine, Michigan, Nevada, Oregon, Tennessee and Washington. New Mexico in 1983.

TABLE XIV
COPPER SMELTERS IN NORTH AMERICA

End Of 1983-Short Tons

| Company | Location Of Plant | Annual Capacity |
|------------------------------------|----------------------|------------------|
| United States | | |
| ASARCO Incorporated | Hayden, Ariz. | 960,000 |
| | El Paso, Texas | 576,000 |
| | Tacoma, Wash. | 600,000 |
| Chemetco Inc. | Alton, Illinois | 150,000 |
| Copper Range Company | | |
| White Pine Copper Division | White Pine, Mich. | 70,000 |
| Inspiration Consolidated | | |
| Copper Company | Inspiration, Ariz. | 450,000 |
| Kennecott | | |
| Chino Mines Company | Hurley, N.M. | 300,000 |
| Nevada Mines Division | McGill, Nev. | 255,000 |
| Ray Mines Division | Hayden, Ariz. | 360,000 |
| Utah Copper Division | Garfield, Utah | 820,000 |
| Magma Copper Company | | |
| San Manuel Division | San Manuel, Ariz. | 800,000 |
| Phelps Dodge Corporation | | |
| Douglas Smelter | Douglas, Ariz. | 500,000 |
| Morenci Branch | Morenci, Ariz. | 650,000 |
| New Cornelia Branch | Ajo, Ariz. | 190,000 |
| Tyrone Branch | Playas, N.M. | 750,000 |
| Tennessee Chemical Company | Copperhill, Tenn. | 18,000 |
| United States Metals Refining | | |
| Co., A Subsidiary Of AMAX Inc. | Carteret, N.J. | 250,000 |
| Total (a) | | 7,699,000 |
| Canada | | |
| Falconbridge Ltd. | Falconbridge, Ont. | 700,000 |
| Gaspe Mines | Murdochville, Que. | 357,000 |
| Hudson Bay Mining & Smelting | | |
| Company Ltd. | Flin Flon, Manitoba | 520,000 |
| Inco Ltd. | Copper Cliff, Ont. | 2,400,000 |
| Noranda Mines, Ltd. | Noranda, Que. | 1,000,000 |
| Total (a) | | 4,977,000 |
| Mexico | | |
| Cia. Minera De Santa Rosalia, S.A. | Santa Rosalia, Baja, | |
| | Calif. | 100,000 |
| Compania Minera De Cananea, S.A. | Cananea, Son. | 277,000 |
| Industrial Minera Mexico, S.A. | San Luis Potosi | 300,000 |
| Total (a) | | 677,000 |

Source: American Bureau of Metal Statistics Inc.

The capacity of copper smelting works is given as estimated by the respective proprietors.

(a) Tons of material.

(b) Tons of product.

TABLE XV

Copper Production Of Companies (g)

Short Tons

| | 1979 | 1980 | 1981 | 1982 | 1983 |
|-----------------------------------|---------|---------|---------|---------|---------|
| United States | | | | | |
| Anaconda Copper Company | | | | | |
| (own mines) (d) | 152,077 | 92,718 | 149,257 | 164,291 | 43,243 |
| Anamax Mining Company | 147,531 | 115,282 | 135,175 | 145,290 | 49,108 |
| ASARCO Incorporated | 96,333 | 56,444 | 112,694 | 119,615 | 110,746 |
| Cominco American Incorporated | | | | | |
| Copper Range Company | | | | | |
| White Pine Copper Division (f) | 43,735 | 35,770 | 43,362 | 22,600 | 26,575 |
| And Dresser Minerals (e) | 3,128 | 2,813 | 2,058 | 2,033 | 869 |
| Cyprus Bagdad Copper Company | 65,545 | 63,960 | 71,507 | 86,623 | 81,033 |
| Cyprus Johnson Copper Company | 5,016 | 5,151 | 5,347 | 4,851 | 4,859 |
| Cyprus Pima Mining Company | 8,532 | 27,966 | 40,632 | 20,201 | - |
| Day Mines Inc. | n.a. | 1,996 | (l) | (l) | (l) |
| Coeur Mines | n.a. | 55 | (l) | (l) | (l) |
| Galena Mine | n.a. | 261 | (l) | (l) | (l) |
| Victoria Mine | n.a. | 1,680 | (l) | (l) | (l) |
| Duval Corporation | 132,255 | 144,640 | 130,555 | 58,027 | 71,510 |
| Hecla Mining Company (a) | 649 | 494 | 1,566 | 1,159 | 1,283 |
| Coeur Mine (j) | n.a. | n.a. | 59 | 60 | 56 |
| Consolidated Silver (m) | n.a. | 3 | 43 | 2 | - |
| Galena Mine (k) | n.a. | n.a. | 316 | 330 | 307 |
| Lucky Friday Mine | 421 | 442 | 374 | 666 | 756 |
| Sunshine Mine | 228 | 52 | 235 | 101 | 164 |
| Victoria Mine | n.a. | n.a. | 539 | - | - |
| Inspiration Consolidated | | | | | |
| Copper Company (f) | 46,083 | 40,812 | 64,700 | 54,699 | 40,778 |
| Kennecott Minerals Company | | | | | |
| (U.S. mines) | 387,774 | 335,914 | 372,213 | 285,716 | 318,000 |
| Magma Copper Company (f) | 155,135 | 99,340 | 165,560 | 132,374 | 99,705 |
| Superior Division | 39,084 | 22,969 | 42,462 | 25,633 | - |
| San Manuel Division | 116,051 | 76,371 | 123,098 | 106,741 | 99,705 |
| Noranda Lakeshore Mines, Inc. (b) | - | - | 13,035 | 22,800 | 18,760 |
| Phelps Dodge Corporation | | | | | |
| (U.S. mines) (b) | 342,900 | 267,800 | 315,700 | 150,100 | 263,100 |
| Pinto Valley Copper Corporation | 77,416 | 52,819 | 92,311 | 56,848 | 10,264 |
| Ranchers-Exploration And | | | | | |
| Development Corp. | 5,982 | 7,115 | 6,663 | 3,998 | - |
| Bluebird Mine | 5,480 | 6,550 | 6,663 | 3,998 | - |
| Old Reliable Mine (i) | 502 | 565 | - | - | - |
| Tennessee Chemical Company | 13,998 | 10,938 | 12,619 | 11,685 | 11,725 |
| Refiners (c) | 548,892 | 380,314 | 529,087 | 465,987 | 401,567 |
| AMAX Copper, Inc. | 217,937 | 155,581 | 169,275 | 147,509 | 126,799 |
| ASARCO Incorporated | 330,955 | 224,733 | 359,812 | 318,478 | 274,768 |

(a) Includes Hecla's share of production from each mining property.

(b) Includes copper produced from purchased ores.

(c) The totals for these concerns are to a large extent duplications of the reports of other producers.

(d) Includes Anaconda's 50% share of Anamax Mining Company.

(e) Magmont mine.

(f) Refined production.

(g) Copper content of mine production unless otherwise noted.

(h) Mine abandoned in 1979.

(i) Mine abandoned in 1981.

(j) Operated by ASARCO - Shows Hecla Mines share of 5%.

(k) Operated by ASARCO - Shows Hecla Mines share of 25%.

(l) On October 20, 1981, Day Mines, Inc. merged into a subsidiary of Hecla Mining Company.

(m) Operated by Hecla Mining Company - Shows Hecla's 64% share.

Source: Non-Ferrous Metal Data 1983, p. 22. American Bureau of Metal Statistics Inc.

TABLE XVI

Imports Of Copper Into The United States

Short Tons

| | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---------|---------|---------|---------|---------|
| Ore, Matte And Regulus, Copper Content | 25,182 | 16,007 | 36,036 | 108,133 | 102,803 |
| Unrefined Black, Blister & Converter Copper In Pigs, Bars, Etc. | 75,107 | 51,780 | 81,268 | 114,021 | 87,588 |
| Refined Copper In Cathodes, Ingots, Plates, Or Bars | 237,174 | 504,983 | 391,208 | 313,909 | 532,397 |
| Waste & Scrap (unalloyed) | 16,150 | 17,696 | 19,443 | 18,056 | 25,450 |
| Waste & Scrap (alloyed) | 15,898 | 14,887 | 19,334 | 20,760 | 34,597 |

Source: U.S. Bureau of the Census.

Exports Of Copper From The United States

Short Tons

| | 1979 | 1980 | 1981 | 1982 | 1983 |
|--|--------|---------|---------|---------|--------|
| Ore, Concentrates & Unrefined, Copper Content | 49,124 | 117,755 | 166,207 | 215,256 | 47,110 |
| Refined In Ingots, Bars Or Other Forms | 88,697 | 18,938 | 30,946 | 38,554 | 96,482 |
| Refined Copper (re-exports) | 1,351 | 4,910 | 35,081 | 1,178 | 718 |
| Waste & Scrap (a) | 59,614 | 67,489 | 55,202 | 59,987 | 52,897 |
| Pipes & Tubes (a) | 9,399 | 19,458 | 12,059 | 5,047 | 3,991 |
| Plates & Sheets (a) | 724 | 2,032 | 2,573 | 13,038 | 1,511 |
| Wire & Cable, Bare | 8,591 | 6,937 | 7,742 | 8,326 | 9,163 |
| Semi-Fabricated Forms | 21,449 | 45,272 | 20,338 | 19,394 | 10,404 |
| Insulated Copper Wire & Cable (b) | 93,440 | 69,727 | 89,538 | 70,070 | 67,714 |

Source: U.S. Bureau of the Census.

(a) Metal weight; chiefly copper.

(b) Gross weight.

Imports Of Copper Into The United States By Countries

Short Tons

| | 1979 | 1980 | 1981 | 1982 | 1983 |
|-------------------------------|---------------|---------------|---------------|----------------|----------------|
| Ore, Matte And Regulus | | | | | |
| Canada | 4,810 | 2,720 | 2,393 | 22,850 | 41,302 |
| Mexico | 210 | 25 | 12,412 | 57,814 | 34,352 |
| Honduras | - | - | - | - | 2,260 |
| Nicaragua | 2 | - | - | - | - |
| Bolivia | - | - | - | 14 | 26 |
| Chile | 544 | 515 | 217 | 5,423 | 7,595 |
| Peru | 1,643 | 1,440 | 3,115 | 1,093 | 4,406 |
| Netherlands | - | - | - | - | 433 |
| Japan | - | - | - | - | 11 |
| Philippines | 16,898 | 9,807 | 16,921 | 17,605 | 9,269 |
| Saudi Arabia | - | - | 60 | - | - |
| Botswana | - | - | - | - | 1 |
| South Africa | - | - | - | 59 | 364 |
| Zimbabwe | - | - | - | 6 | - |
| Australia | 1,075 | 1,500 | 918 | 3,269 | 2,784 |
| Other Countries | - | - | - | - | - |
| Total | 25,182 | 16,007 | 36,036 | 108,133 | 102,803 |

(continued next page)

TABLE XVI (continued)

Imports Of Copper Into The United States By Countries (continued)

Short Tons

| | 1979 | 1980 | 1981 | 1982 | 1983 |
|--|----------------|----------------|----------------|----------------|----------------|
| Unrefined Black, Blister And Converter Copper In Pigs, Bars, Etc. | | | | | |
| Canada | 7,659 | 4,358 | 27 | 29,542 | 4,546 |
| Mexico | 3,511 | 1,022 | 8,046 | 4,772 | 10,206 |
| Argentina | - | - | - | - | 1,808 |
| Bolivia | 565 | - | - | - | - |
| Chile | 34,731 | 21,197 | 41,825 | 67,172 | 66,255 |
| Peru | 24,294 | 17,675 | 17,799 | 11,213 | 3,804 |
| Belgium | 1,764 | 35 | 23 | 1,147 | - |
| Germany, F.R. | - | - | 38 | 116 | 19 |
| Sweden | 1,356 | - | 1,087 | - | - |
| United Kingdom | - | - | 20 | 11 | - |
| Japan | 17 | 2,999 | 3,855 | - | - |
| Egypt | - | - | - | - | 854 |
| Australia | 1,210 | 4,494 | 8,548 | - | - |
| Other Countries | - | - | - | 48 | 97 |
| Total | 75,107 | 51,780 | 81,268 | 114,021 | 87,589 |
| Cathodes, Ingots, Plates, Or Bars | | | | | |
| Canada | 70,352 | 144,263 | 93,548 | 72,046 | 100,667 |
| Mexico | 346 | 2,878 | 4,816 | 3,111 | - |
| Argentina | - | 551 | 1,102 | - | - |
| Chile | 92,098 | 117,471 | 149,480 | 182,003 | 297,368 |
| Peru | 32,295 | 38,776 | 52,576 | 14,920 | 34,458 |
| Belgium | 803 | - | 2,133 | 1,166 | 6,364 |
| France | 105 | 40 | 60 | - | 20 |
| Germany, F.R. | 6,635 | 445 | 145 | 7 | 1,098 |
| Norway | 219 | 533 | 416 | 2,265 | 280 |
| Spain | - | 88 | - | - | - |
| Sweden | 8,261 | 20 | 20 | 20 | - |
| United Kingdom | 888 | 60 | 643 | 358 | 346 |
| Yugoslavia | 3,759 | 5,006 | 2,698 | - | - |
| Japan | - | 115,448 | 7,062 | 15 | 10,121 |
| South Korea | - | - | - | 2,205 | 3,307 |
| Ghana | - | - | - | - | 3,816 |
| South Africa | 2,206 | 2,396 | - | - | 15,113 |
| Tanzania | 55 | - | - | - | - |
| Zaire | 1,621 | 5,517 | 27,212 | 24,535 | 32,081 |
| Zambia | 17,477 | 71,491 | 49,144 | 10,368 | 27,219 |
| U.S.S.R. | - | - | - | 728 | - |
| Hungary | - | - | - | 60 | - |
| Other Countries | 54 | - | 153 | 102 | 140 |
| Total | 237,174 | 504,983 | 391,208 | 313,909 | 532,398 |

Source: U.S. Bureau of the Census.

TABLE XVII

"COVERED EMPLOYMENT" AND WAGES IN ARIZONA COPPER MINING AND SMELTING

| Year | Average No. Covered Employees 1/ | Total Wages | Average Annual Wage | Average Weekly Wage | Tons Copper Ore 2/ |
|---------|--|----------------|---------------------------|---------------------------|--------------------------|
| 1948 | 11,493 | \$ 41,318,524 | \$3,595 | \$ 69.13 | 39,072,204 |
| 1949 | 11,001 | 40,612,224 | 3,692 | 71.00 | 37,365,611 |
| 1950 | 10,181 | 41,994,321 | 4,125 | 79.33 | 41,757,273 |
| 1951 | 10,754 | 47,825,698 | 4,447 | 85.52 | 42,784,388 |
| 1952 | 11,365 | 54,950,235 | 4,835 | 93.14 | 44,472,522 |
| 1953 | 12,068 | 62,742,982 | 5,199 | 99.98 | 45,187,838 |
| 1954 | 12,502 | 65,518,853 | 5,241 | 100.79 | 43,072,894 |
| 1955 | 12,399 | 71,293,263 | 5,750 | 110.58 | 52,189,728 |
| 1956 | 14,008 | 83,568,996 | 5,966 | 114.73 | 60,468,580 |
| 1957 | 14,652 | 85,125,320 | 5,809 | 111.71 | 59,571,834 |
| 1958 | 14,100 | 74,726,972 | 5,300 | 101.93 | 56,255,809 |
| 1959 | 11,568 | 72,095,130 | 6,232 | 119.85 | 53,121,545 |
| 1960 | 13,764 | 90,312,848 | 6,562 | 126.19 | 66,032,439 |
| 1961 | 14,275 | 97,271,286 | 6,814 | 131.04 | 71,918,991 |
| 1962 | 14,408 | 101,920,108 | 7,074 | 136.04 | 78,868,147 |
| 1963 | 14,303 | 104,291,588 | 7,292 | 140.23 | 80,615,132 |
| 1964 | 14,720 | 113,792,031 | 7,730 | 148.65 | 86,132,039 |
| 1965 | 15,239 | 122,163,124 | 8,016 | 154.16 | 92,859,535 |
| 1966 1/ | 17,018 | 137,187,611 | 8,061 | 155.02 | 101,558,298 |
| 1967 | 13,426 | 108,427,206 | 8,076 | 155.31 | 74,289,203 |
| 1968 | 15,734 | 136,089,579 | 8,649 | 166.33 | 101,293,963 |
| 1969 | 19,459 | 173,183,018 | 8,900 | 171.15 | 127,848,828 |

-continued-

TABLE XVII CONTINUED

"COVERED EMPLOYMENT" AND WAGES IN ARIZONA COPPER MINING AND SMELTING

| Year | Average Covered Employees ^{1/} | Total Wages | Average Annual Wage | Average Weekly Wage | Tons Copper Ore ^{2/} |
|------|---|----------------|---------------------------|---------------------------|-------------------------------------|
| 1970 | 21,479 | \$ 201,665,064 | \$ 9,389 | \$180.56 | 150,241,000 |
| 1971 | 21,231 | 211,978,597 | 9,984 | 192.00 | 149,294,000 |
| 1972 | 23,233 | 254,717,341 | 10,964 | 210.85 | 165,914,825 ^{2/} |
| 1973 | 25,494 | 291,294,328 | 11,426 | 218.89 | 181,311,945 |
| 1974 | 27,894 | 340,832,096 | 12,219 | 234.98 | 178,913,296 |
| 1975 | 25,950 | 363,349,178 | 14,002 | 269.27 | 168,750,152 |
| 1976 | 25,631 | 405,289,034 | 15,812 | 304.08 | 194,136,559 |
| 1977 | 23,373 | 398,539,789 | 16,835 | 323.75 | 168,641,401 |
| 1978 | 21,092 | 397,790,419 | 18,860 | 362.69 | 178,204,491 |
| 1979 | 23,239 | 494,963,476 | 21,299 | 409.60 | 203,997,408 |
| 1980 | 21,602 | 510,168,454 | 23,617 | 454.17 | 169,650,401 |
| 1981 | 26,031 | 687,434,798 | 26,408 | 507.85 | 216,787,430 |
| 1982 | 17,182 | 487,415,292 | 28,368 | 545.53 | 135,768,647 |
| 1983 | 13,864 | 395,266,852 | 28,510 | 548.29 | 135,301,652 |

Source: This report, Table XVII; "Minerals Yearbook - Area Reports: Domestic", U.S. Bureau of Mines; Research and Statistics Unit, Arizona Department of Economic Security.

^{1/} "Covered Employment" by law includes all employees of employers of three or more persons. Prior to 1966 only a portion of the workers in smelting, refining, and rod fabrication were included in this table.

^{2/} Mine production in short tons of lode ore from "Arizona, Mine Production by Class of Ore", reported by U. S. Bureau of Mines. In 1982 and thereafter the tonnage may include copper-zinc, copper-lead and lead-zinc ore combined to avoid disclosing individual company confidential data.

TABLE XVIII

ARIZONA INDUSTRIES COVERED BY SOCIAL SECURITY

YEAR - 1983

| <u>Industry</u> | <u>Average Number of Employees</u> <u>1/</u> | <u>Total Wages</u> | <u>Average Annual Wage</u> | <u>Average Weekly Wage</u> |
|--|--|------------------------|------------------------------------|------------------------------------|
| Copper Mining | 11,384 | 324,857,691 | 28,536 | 548.76 |
| Copper Smelting, Refining & Rod Fabrication | 2,480 | 70,409,161 | 28,391 | 545.98 |
| TOTAL COPPER MINING & PROCESSING | 13,864 | 395,266,852 | 28,510 | 548.28 |
| Other Mining, Quarrying & Processing | 2,874 | 78,853,999 | 27,437 | 527.64 |
| ALL MINING, QUARRYING & PROCESSING | 16,738 | 474,120,851 | 28,326 | 544.73 |
| Mfg. Except Copper Processing | 153,529 | 3,321,016,957 | 21,631 | 415.98 |
| Construction | 79,642 | 1,521,577,945 | 19,105 | 367.40 |
| Transportation, Utilities, etc. <u>2/</u> | 49,648 | 1,135,493,360 | 22,871 | 439.82 |
| Wholesale-Retail Trade | 260,910 | 2,327,163,358 | 8,919 | 171.53 |
| Services, Finance & Misc. | 296,820 | 4,498,905,873 | 15,157 | 291.48 |
| Agriculture & Related Services | 26,735 | 270,317,260 | 10,111 | 194.44 |
| Federal, State & Local Government | 193,160 | 3,547,795,767 | 18,367 | 353.21 |
| TOTAL AND AVERAGES | 1,077,182 | 17,096,391,371 | 15,871 | 305.21 |

Source: Research and Statistics Unit, Arizona Department of Economic Security.

1/ Includes all covered employees.2/ Transportation exclusive of railroads.

TABLE XIX
EMPLOYMENT, EARNINGS AND HOURS IN COPPER MINING
IN THE UNITED STATES AND ARIZONA ^{1/}

| | All Employees | | PRODUCTION WORKERS | | | | | | | | | | | | |
|----|-------------------------|-------|-------------------------|-------|-------------------------|--------|----------------------|------|-------------------------|-------|-----------------------------------|--------|---------------------------------|--------|--------|
| | Average No. (Thousands) | | Average No. (Thousands) | | Average Weekly Earnings | | Average Weekly Hours | | Average Hourly Earnings | | Average Earnings Per Man Per Year | | Aggregate Man-Hours (Thousands) | | |
| | 2/ | 3/ | 4/ | 5/ | Ariz. | U.S. | Ariz. | U.S. | 6/ | U.S. | 7/ | U.S. | 8/ | U.S. | |
| | Period | Ariz. | U.S. | Ariz. | | | | | | | | | | | U.S. |
| 61 | 1970 | 18.8 | 37.0 | 14.9 | 29.5 | 173.01 | 175.67 | 43.8 | 44.7 | 3.95 | 3.93 | 8,997 | 9,135 | 33,936 | 68,570 |
| | 1971 | 18.9 | 34.7 | 14.9 | 26.8 | 178.50 | 178.46 | 42.4 | 42.9 | 4.21 | 4.16 | 9,282 | 9,280 | 32,852 | 59,785 |
| | 1972 | 20.5 | 38.9 | 16.1 | 30.7 | 194.69 | 192.19 | 41.6 | 41.6 | 4.68 | 4.62 | 10,124 | 9,994 | 34,827 | 66,410 |
| | 1973 | 21.5 | 42.3 | 17.6 | 33.7 | 206.75 | 206.42 | 41.6 | 42.3 | 4.97 | 4.88 | 10,751 | 10,734 | 38,072 | 74,127 |
| | 1974 | 24.0 | 42.8 | 19.1 | 33.8 | 222.16 | 226.46 | 39.6 | 41.1 | 5.61 | 5.51 | 11,552 | 11,776 | 39,331 | 72,237 |
| | 1975 | 22.5 | 37.1 | 17.9 | 28.4 | 247.43 | 247.14 | 38.6 | 39.2 | 6.41 | 6.33 | 12,866 | 12,903 | 35,929 | 57,891 |
| | 1976 | 21.7 | 35.5 | 17.2 | 27.0 | 286.31 | 280.70 | 40.1 | 40.1 | 7.14 | 7.00 | 14,888 | 14,596 | 35,865 | 56,300 |
| | 1977 | 19.3 | 35.1 | 15.3 | 26.9 | 302.99 | 288.73 | 39.4 | 38.6 | 7.69 | 7.48 | 15,755 | 15,014 | 31,347 | 53,994 |
| | 1978 | 17.2 | 35.2 | 13.7 | 26.9 | 344.76 | 338.40 | 40.8 | 40.0 | 8.45 | 8.46 | 17,928 | 17,597 | 29,066 | 55,952 |
| | 1979 | 19.3 | 31.9 | 15.3 | 24.6 | 404.81 | 405.03 | 42.3 | 42.5 | 9.57 | 9.53 | 21,050 | 21,061 | 33,654 | 54,366 |
| | 1980 | 17.7 | 29.4 | 14.0 | 22.6 | 446.19 | 435.01 | 41.7 | 41.0 | 10.70 | 10.61 | 23,202 | 22,621 | 30,358 | 48,183 |
| | 1981 | 21.9 | 36.2 | 17.4 | 27.9 | 497.28 | 492.54 | 41.2 | 41.6 | 12.07 | 11.84 | 25,859 | 25,612 | 37,278 | 60,353 |
| | 1982 | 15.2 | 25.3 | 12.1 | 18.5 | 495.60 | 484.91 | 38.3 | 38.7 | 12.94 | 12.53 | 25,771 | 25,215 | 24,098 | 37,229 |
| | 1983 | 11.3 | 19.8 | 9.0 | 14.2 | 519.25 | 522.69 | 39.1 | 39.9 | 13.28 | 13.10 | 27,001 | 27,180 | 18,299 | 29,462 |

TABLE XIX CONTINUED
EMPLOYMENT EARNINGS AND HOURS IN COPPER MINING
IN THE UNITED STATES AND ARIZONA

| Period | Copper Ore Mined (Thousand Short Tons) | | Copper Produced (Recoverable Content) (Thousand Pounds) | | Worker Productivity | | | |
|--------|---|-------------------|---|-----------|--|-------|---|--------|
| | Ariz. | U.S. | Ariz. | U.S. | Copper Ore Mined per man-hour (tons) | U.S. | Copper Produced per man-hour (pounds) | U.S. |
| 1970 | 150,241 | 257,729 | 1,826,734 | 3,368,957 | 4.427 | 3.759 | 53.829 | 49.132 |
| 1971 | 149,294 | 242,656 | 1,633,568 | 2,986,599 | 4.544 | 4.059 | 49.725 | 49.996 |
| 1972 | 165,815 | 266,831 | 1,816,118 | 3,264,113 | 4.761 | 4.017 | 52.161 | 49.151 |
| 1973 | 173,605 | 289,998 | 1,847,635 | 3,386,357 | 4.872 | 3.912 | 48.530 | 45.683 |
| 1974 | 178,821 | 293,443 | 1,710,744 | 3,145,148 | 4.547 | 4.062 | 43.496 | 43.539 |
| 1975 | 168,656 | 263,003 | 1,619,535 | 2,772,111 | 4.694 | 4.543 | 45.076 | 47.885 |
| 1976 | 194,046 | 283,736 | 2,043,168 | 3,166,889 | 5.410 | 5.040 | 56.968 | 56.250 |
| 1977 | 168,601 | 259,974 | 1,843,949 | 2,964,539 | 5.379 | 4.815 | 58.824 | 54.905 |
| 1978 | 178,201 | 263,722 | 1,965,072 | 2,955,210 | 6.131 | 4.713 | 67.607 | 52.817 |
| 1979 | 203,977 | 291,078 | 2,085,556 | 3,140,110 | 6.061 | 5.369 | 61.971 | 57.759 |
| 1980 | 169,650 | 241,090 | 1,669,495 | 2,527,920 | 5.588 | 5.004 | 54.994 | 52.465 |
| 1981 | 216,787 | 306,089 | 2,294,437 | 3,354,548 | 5.815 | 5.072 | 61.549 | 55.582 |
| 1982 | 146,125 | 200,589 | 1,697,500 | 2,507,070 | 6.064 | 5.388 | 70.442 | 67.342 |
| 1983 | 152,902 <u>1/</u> | 196,203 <u>2/</u> | 1,514,538 <u>1/</u> | 2,288,612 | 8.356 | 6.660 | 82,766 | 77.680 |

Source: Research and Statistics Unit, Arizona Department of Economic Security; "Minerals Yearbook -- Metals, Minerals," U.S. Bureau of Mines. "Employment and Earnings", March issues, U.S. Department of Labor

1/ Table I this publication.

2/ U.S. Bureau of Mines

TABLE XIX CONTINUED
EMPLOYMENT, EARNINGS AND HOURS IN COPPER MINING
IN THE UNITED STATES AND ARIZONA 1/

- 1/ Statistics do not reflect workers in copper smelting, refining and rod fabrication.
- 2/ These figures are estimates made by the Arizona Department of Economic Security, in cooperation with the U.S. Bureau of Labor Statistics, and they include all full and part-time wage and salary workers who were employed in copper mining in any part of the pay periods which included the 12th of each month of the year.
- 3/ Estimates made by the U.S. Bureau of Labor Statistics, in cooperation with the 50 states, and based upon monthly samplings similar to those in 2/ above, adjusted periodically to census bench marks.
- 4/ Estimates of production (non-supervisory) workers based upon samplings as in 2/ above. Since 1975, figures have been calculated by the Arizona Department of Mines and Mineral Resources dividing the annual number of "All Employees - Arizona" by a factor of 1.26. This factor was derived by comparing the annual number of "All Employees - Arizona" with "Production Workers - Arizona" from 1970 to 1974.
- 5/ Earnings figures for a particular year is the product of "Average Hourly Earnings" and "Average Weekly Hours" for that year.
- 6/ Gross payroll aggregates, exclusive of irregular bonuses and other pay not earned in a sample pay period, are divided by gross man-hour aggregates of production and related workers for the period in order to determine average hourly earnings.
- 7/ "Average Weekly Earnings" times 52 weeks.
- 8/ Number of production workers times "Average Weekly Hours" times 52 weeks.

TABLE XX

REFINED COPPER INVENTORIES AT MONTH END
AMOUNTS IN THOUSANDS OF SHORT TONS

U. S. STOCKS

| | | | | | | | | | | | | |
|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 1981 | Jan | 261.6 | Mar | 236.8 | May | 243.4 | Jul | 276.9 | Sep | 275.5 | Nov | 301.2 |
| | Feb | 249.4 | Apr | 245.5 | Jun | 264.7 | Aug | 276.0 | Oct | 281.6 | Dec | 338.6 |
| 1982 | Jan | 351.9 | Mar | 387.3 | May | 422.5 | Jul | 463.7 | Sep | 436.2 | Nov | 470.8 |
| | Feb | 375.9 | Apr | 409.8 | Jun | 448.1 | Aug | 449.9 | Oct | 438.2 | Dec | 484.5 |
| 1983 | Jan | 489.6 | Mar | 508.9 | May | 519.4 | Jul | 509.0 | Sep | 509.1 | Nov | 505.2 |
| | Feb | 501.6 | Apr | 524.1 | Jun | 498.7 | Aug | 522.7 | Oct | 514.2 | Dec | 475.3 |

STOCKS OUTSIDE U. S.

| | | | | | | | | | | | | |
|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| 1981 | Jan | 485.2 | Mar | 463.0 | May | 449.8 | Jul | 454.9 | Sep | 433.4 | Nov | 403.0 |
| | Feb | 471.0 | Apr | 458.8 | Jun | 446.0 | Aug | 454.7 | Oct | 419.4 | Dec | 432.5 |
| 1982 | Jan | 446.3 | Mar | 459.5 | May | 459.0 | Jul | 492.0 | Sep | 521.7 | Nov | 642.9 |
| | Feb | 448.4 | Apr | 452.2 | Jun | 479.3 | Aug | 504.4 | Oct | 592.3 | Dec | 699.9 |
| 1983 | Jan | 760.8 | Mar | 759.1 | May | 780.0 | Jul | 683.0 | Sep | 767.2 | Nov | 810.4 |
| | Feb | 766.4 | Apr | 795.5 | Jun | 722.2 | Aug | 757.4 | Oct | 765.2 | Dec | 832.5 |

WORLD STOCKS

| | | | | | | | | | | | | |
|------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|-----|---------|
| 1981 | Jan | 746.8 | Mar | 699.8 | May | 693.2 | Jul | 731.8 | Sep | 708.9 | Nov | 704.2 |
| | Feb | 720.4 | Apr | 704.3 | Jun | 710.7 | Aug | 730.7 | Oct | 701.0 | Dec | 771.1 |
| 1982 | Jan | 798.2 | Mar | 846.8 | May | 881.5 | Jul | 955.7 | Sep | 957.9 | Nov | 1,113.7 |
| | Feb | 824.3 | Apr | 862.0 | Jun | 927.4 | Aug | 954.3 | Oct | 1,030.5 | Dec | 1,184.4 |
| 1983 | Jan | 1,250.4 | Mar | 1,268.0 | May | 1,299.4 | Jul | 1,192.0 | Sep | 1,276.3 | Nov | 1,315.6 |
| | Feb | 1,268.0 | Apr | 1,319.6 | Jun | 1,220.8 | Aug | 1,280.1 | Oct | 1,279.4 | Dec | 1,307.8 |

Source: American Bureau of Labor Statistics

Prepared by: JLBC Staff

Date: September 5, 1984

TABLE XXI
AVERAGE QUOTED PRICE OF ^{1/}
ELECTROLYTIC COPPER WIREBAR
DOMESTIC, DELIVERED

| | <u>1973</u> | <u>1974</u> | <u>1975</u> | <u>1976</u> | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>1982</u> | <u>1983</u> |
|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| January | 52.388 | 68.753 | 69.028 | 62.625 | 66.240 | 62.625 | 76.574 | 119.385 | 88.570 | 78.634 | 80.219 |
| February | 54.571 | 68.575 | 64.180 | 63.625 | 68.625 | 63.593 | 89.697 | 133.808 | 86.071 | 78.779 | 84.024 |
| March | 59.806 | 68.575 | 64.180 | 64.682 | 72.551 | 62.410 | 96.718 | 106.040 | 87.382 | 75.862 | 82.072 |
| April | 60.083 | 68.575 | 64.180 | 69.241 | 74.393 | 64.625 | 98.322 | 94.851 | 88.033 | 76.273 | 83.493 |
| May | 60.083 | 81.459 | 63.780 | 70.625 | 72.606 | 64.768 | 91.234 | 93.479 | 85.798 | 77.948 | 85.634 |
| June | 60.083 | 86.245 | 62.136 | 70.625 | 71.199 | 66.569 | 88.241 | 92.713 | 85.226 | 71.488 | 81.836 |
| July | 60.083 | 86.596 | 62.484 | 74.625 | 67.996 | 64.079 | 86.768 | 103.565 | 84.412 | 71.053 | 82.947 |
| August | 60.083 | 86.596 | 63.790 | 74.625 | 63.792 | 67.232 | 91.335 | 100.708 | 87.387 | 70.999 | 80.542 |
| September | 60.083 | 83.663 | 63.790 | 74.625 | 60.625 | 67.632 | 95.853 | 98.864 | 84.722 | 71.065 | 77.587 |
| October | 60.083 | 78.428 | 63.790 | 72.064 | 60.625 | 70.495 | 99.106 | 99.471 | 82.312 | 72.413 | 73.392 |
| November | 60.163 | 76.249 | 63.790 | 70.625 | 60.625 | 71.191 | 99.708 | 96.982 | 81.216 | 72.968 | 69.581 |
| December | 66.367 | 73.572 | 63.790 | 65.774 | 61.942 | 71.897 | 106.448 | 89.127 | 80.293 | 74.230 | 70.805 |

Source: Metals Week

^{1/} MW US Producer Delivered.

Prepared by: JLBC Staff

TABLE XXII

Estimated production costs for producing copper mines,¹ per pound of refined copper

| Type of operation and country | Number of mines | Mine cost | Mill cost ² | Smelter-refinery cost ³ | Total operating cost ^{4,5} | Taxes ⁶ | Byproduct credits | Net cost ⁷ | Total cost, ^{8,9} FOB refinery |
|--|-----------------|-----------|------------------------|------------------------------------|-------------------------------------|--------------------|-------------------|-----------------------|---|
| Surface: | | | | | | | | | |
| Canada | 10 | \$0.42 | \$0.44 | \$0.27 | \$1.13 | \$0.03 | \$0.29 | \$0.87 | \$1.04 |
| Chile | 3 | .28 | .15 | .26 | .69 | .10 | .19 | .60 | .76 |
| Peru | 4 | .23 | .28 | .31 | .82 | .12 | .06 | .88 | 1.12 |
| Philippines | 6 | .33 | .36 | .27 | .96 | .09 | .14 | .91 | 1.04 |
| Zaire | 3 | .19 | .11 | .30 | .60 | .22 | .12 | .70 | .79 |
| Other countries | 12 | .24 | .30 | .27 | .81 | .14 | .34 | .61 | .81 |
| Total or average, foreign countries ⁵ | 38 | .26 | .24 | .28 | .77 | .13 | .21 | .69 | .86 |
| United States | 19 | .30 | .28 | .38 | .96 | .05 | .16 | .86 | 1.02 |
| Total or average, all countries ⁵ | 57 | .27 | .25 | .31 | .83 | .11 | .20 | .74 | .91 |
| Underground: | | | | | | | | | |
| Australia | 4 | .22 | .12 | .39 | .73 | .08 | .09 | .73 | .89 |
| Canada | 10 | .32 | .14 | .83 | 1.29 | .07 | .92 | .44 | .61 |
| Chile | 4 | .36 | .19 | .20 | .75 | .04 | .06 | .72 | .79 |
| Philippines | 5 | .41 | .33 | .28 | 1.02 | .10 | .40 | .72 | .85 |
| Zaire | 3 | .42 | .16 | .38 | .97 | .24 | .15 | 1.05 | 1.14 |
| Zambia | 6 | .41 | .20 | .27 | .87 | .17 | .03 | 1.01 | 1.09 |
| Other countries | 20 | .57 | .24 | .58 | 1.38 | .12 | .88 | .63 | .92 |
| Total or average, foreign countries ⁵ | 52 | .38 | .19 | .32 | .88 | .09 | .21 | .77 | .88 |
| United States | 5 | .54 | .31 | .35 | 1.20 | .07 | .10 | 1.18 | 1.26 |
| Total or average, all countries ⁵ | 57 | .40 | .20 | .32 | .92 | .09 | .19 | .82 | .93 |
| Grand total or average:⁵ | | | | | | | | | |
| Foreign countries | 90 | .31 | .22 | .30 | .82 | .11 | .21 | .73 | .87 |
| United States | 24 | .35 | .29 | .37 | 1.01 | .05 | .15 | .92 | 1.07 |
| All countries | 114 | .32 | .23 | .32 | .87 | .10 | .20 | .77 | .92 |

¹ Does not include mines having combined surface and underground operations. Average ore grade and annual refined copper production in table 13.

² Does not include mines having leach facilities only. Mines having combined float and leach operations are included.

³ Includes smelting and refining charges, transportation costs to the smelter and refinery (but not to market), and postmill processing charges for other (noncopper) commodities.

⁴ Summation of mine, mill, and smelter-refinery costs.

⁵ Data may not add to totals shown because of independent rounding.

⁶ Includes property, severance, State, and Federal taxes and royalties.

⁷ Total operating cost plus taxes less byproduct credits.

⁸ Net cost plus recovery of capital and profit at a 15-pct ROR.

⁹ Transportation charges from the refinery to the market are not included. These costs are estimated in table 15.

Source: IC 8930 - Bureau of Mines Information Circular/1983
 "Copper Availability - Market Economy Countries" Table 14, p. 18

TABLE XXIII

COPPER RESERVES IN ARIZONA 1/

| COMPANY | DEPOSIT | MAJOR MINERAL TYPE | MILLIONS OF TONS | AVERAGE Cu CONTENT | REMARKS/SOURCE |
|----------------------------|--------------------------|--------------------|------------------|--------------------|--|
| ANAMAX MINING COMPANY | Helvetia | Sulfide | 320 | 0.64 | Publ. 1973; cutoff at 0.3% Cu |
| | Helvetia | Oxide | 20 | 0.55 | Publ. 1973; acid soluble Cu; cutoff at 0.3% acid soluble Cu. |
| | Peach Elgin | Mixed | 23 | 0.75 | Publ. 1973; cutoff at 0.4% Cu. |
| | Twin Buttes & Palo Verde | Sulfide | 113 | 0.67 | Publ. in Amax Inc. 1983 Annual Report. |
| | Twin Buttes & Palo Verde | Oxide | 12 | 1.08 | Publ. in Amax Inc. 1983 Annual Report. |
| ASARCO Inc. | Mission | Sulfide | 81.243 | 0.75 | With 0.17 Ag oz/ton. Publ. ASARCO 1983 Annual Report. |
| | Poston Butte | Mixed | | 0.47 | 32-42 million tons possible. Publ. E & MJ 1972. |
| | Sacaton East (UG) | Sulfide | 15.960 | 1.20 | Publ. in ASARCO Inc. 1983 Annual Report. |
| | San Xavier | Sulfide | 159.149 | 0.51 | With .08 oz/ton Ag. Publ. in 1983 Annual Report. |
| | Silver Bell | Sulfide | 21.722 | 0.68 | With .07 oz/ton Ag. Publ. in 1983 Annual Report. |
| | Silver Bell | Oxide | | | |
| AZTEC MINING CORP. | Mame | Oxide | 2 | 1.00 | Unpublished estimate. |
| CASA GRANDE COPPER COMPANY | Casa Grande | Mixed | 352 | 1.00 | Publ. in Getty Oil Co. 1980 Annual Report. |

TABLE XXIII (Cont.)
COPPER RESERVES IN ARIZONA 1/

| COMPANY | DEPOSIT | MAJOR MINERAL TYPE | MILLIONS OF TONS | AVERAGE Cu CONTENT | REMARKS/SOURCE |
|------------------------|---------------|--------------------|------------------|--------------------|--|
| CITIES SERVICE COMPANY | Cactus | Oxide | | | |
| | Copper Cities | Oxide | | | |
| | Miami | Oxide | | | |
| | Miami East | Mixed (?) | 5.976 | 3.14 | Pub. in Newmont Mining 1983 Annual Report |
| | Old Dominion | Sulfide | | | |
| | Pinto Valley | Sulfide | 384.176 | 0.404 | Pub. in Newmont Mining 1983 Annual Report |
| ----- | | | | | |
| COCHISE DEV. GROUP | Bisbee-North | Mixed (?) | 20 | 0.80 | Unpublished estimate. |
| ----- | | | | | |
| COCHISE MINING CORP. | San Juan | Oxide | 20 | 0.50 | Unpublished estimate. |
| ----- | | | | | |
| CONTINENTAL OIL CO. | Poston Butte | Mixed | 800 | 0.40 | Pub. 1979 from Copper Studies Inc. |
| ----- | | | | | |
| CYPRUS MINES CORP. | Bagdad | Sulfide | 326 | 0.50 | With 0.03 Mo. |
| | Bagdad | Oxide | 38 | 0.33 | Acid soluble Cu. |
| | Bruce | Sulfide | 0.1276 | 3.73 | Pub. 1976 in Form 10-K with 12.8% Zn. |
| | I-10 | Mixed | 100 | 0.52 | Unpublished estimate; with 0.02% Mo. |
| | Johnson | Oxide | 3.926 | 0.40 | Acid soluble Cu. Pub. in 1984 E&MJ. |
| | | | | | International Directory |
| | Pima | Sulfide | 120.767 | 0.482 | Pub.1983 E&MJ International Directory. |
| ----- | | | | | |
| DUVAL CORPORATION | Esperanza | Sulfide | 48.783 | 0.27 | With .034% Mo. |
| | Mineral Park | Sulfide | 35.577 | 0.17 | With .054% Mo. |
| | Sierrita | Sulfide | 328.759 | 0.30 | With .035% Mo. Pub. in 1984 E&MJ Int. Dir. |
| ----- | | | | | |

TABLE XXIII (Cont.)
COPPER RESERVES IN ARIZONA 1/

| COMPANY | DEPOSIT | MAJOR MINERAL TYPE | MILLIONS OF TONS | AVERAGE Cu CONTENT | REMARKS/SOURCE |
|---|------------------------|--------------------|------------------|--------------------|---|
| EISENHOWER MINING CO. | Palo Verde (Anamax) | Sulfide | 93.118 | 0.62 | With 0.14 oz/ton Ag calculated. |
| | Palo Verde (ASARCO) | Sulfide | 28.694 | 0.81 | With 0.23 oz/ton Ag. Published in ASARCO 1983 Annual Report |
| ----- | | | | | |
| EL PASO COMPANY | Emerald Isle | Oxide | 1.5 | 0.40 | 3 million tons at 0.1% Cu. USBM RI 8236, Pub. 1977. |
| ----- | | | | | |
| FREEMPORT-McMORAN INC. | Santa Cruz | Mixed | | | |
| ----- | | | | | |
| INSPIRATION CONSOLIDATED COPPER COMPANY | Christmas (OP) | Sulfide | 7.567 | 0.63 | Pub. in Inspiration Resources 1983 Form 10-K, p. 8 |
| | Christmas (OP) | Oxide | | | |
| | Christmas (UG) | Sulfide | 20.131 | 1.82 | (Same as above) |
| | Inspiration Area Mines | Mixed | 189.695 | 0.52 | (Same as above) |
| | Ox Hide | Oxide | 28.573 | 0.30 | (Same as above) |
| | Sanchez | Oxide | 79.362 | 0.36 | (Same as above) |
| ----- | | | | | |
| KENNECOTT | Chilito | Mixed | | | |
| | Lone Star | Mixed | 2000 | 0.41 | Reported at Ariz. Conference AIME 12/77 |
| | Lone Star Ext. | Mixed | | | |
| | Ray | Sulfide | 606.144 | 0.70 | With .01% Mo. Pub. in "World Mining" 5/81 |
| | Ray | Silicate | 225.760 | 0.68 | Pub. in "World Mining" 5/81. |
| ----- | | | | | |
| KERR MCGEE CORPORATION | Red Mountain | Sulfide | | 0.71 | Pub. 1970 100 million tons possible |
| ----- | | | | | |
| KEYSTONE MINERALS INC. | Korn Kob | Oxide | 8 | 0.50 | Pub. in "Pay Dirt" July 1973 |
| ----- | | | | | |

TABLE XXIII (Cont.)
COPPER RESERVES IN ARIZONA 1/

| COMPANY | DEPOSIT | MAJOR MINERAL TYPE | MILLIONS OF TONS | AVERAGE Cu CONTENT | REMARKS/SOURCE |
|------------------------------|---|--------------------|------------------|--------------------|---|
| MAGMA COPPER COMPANY | Copper Creek Kalamazoo & San Manuel | Sulfide | | | |
| | | Sulfide | 221 proved | 0.72 | Published 1984 E&MJ International Directory |
| | | " | 456 probable | 0.70 | |
| | Superior | Oxide | 205 possible | 0.70 | Published 1984 E&MJ International Directory |
| | | Sulfide | 3.3 proved | 5.80 | |
| | | | 1.1 probable | 5.20 | |
| | | | 0.07 possible | 4.70 | |
| | Vekol Hills | Sulfide | 105 | 0.56 | Pub. 1978, minable by open pit; with 0.014% Mo; 16 million tons oxide Cu. |
| ----- | | | | | |
| McALESTER FUEL CO. | Zonia | Oxide | 20.5 | 0.53 | Pub. in 1980 E&MJ International Directory |
| ----- | | | | | |
| 70 NAVAJO TRIBE (?) | White Mesa | Oxide | 2 | 0.75 | Pub. 1955 |
| ----- | | | | | |
| NORANDA LAKESHORE MINES INC. | Four Metals Lakeshore | Sulfide | 3 | 0.82 | Reported 1965 |
| | | Sulfide | 41 | 0.65 | Published in Noranda's 1983 Annual Report |
| | Lakeshore | (Porphyry) | | | |
| | | Sulfide | 8.9 | 1.35 | Published in Noranda's 1983 Annual Report |
| | Lakeshore | (Tactite) | | | |
| | Ventura | Oxide | 13.1 | 1.16 | Published in Noranda's 1983 Annual Report |
| | | Sulfide | 6.3 | 0.26 | Reported 1965; with 0.28% MoS ₂ |
| ----- | | | | | |
| ORACLE RIDGE MINING PARTNERS | Oracle Ridge | Mixed (?) | 11 | 2.25 | Reported 1977; with 0.64 oz. Ag/ton. Published 1979. |
| ----- | | | | | |
| S.B. OWENS | Carlota | Oxide | 4 | 0.85 | Reported 1979 |
| ----- | | | | | |

TABLE XXIII (Cont.)
COPPER RESERVES IN ARIZONA 1/

| COMPANY | DEPOSIT | MAJOR MINERAL TYPE | MILLIONS OF TONS | AVERAGE Cu CONTENT | REMARKS/SOURCE |
|--|-----------------|--------------------|------------------|--------------------|---|
| PHELPS DODGE CORPORATION | Copper Basin | Sulfide | 175 | 0.55 | Pub. 1974; minable by open pit with 0.02% Mo. |
| | Copper Queen | Mixed | | | |
| | Lavender | Sulfide | | | |
| | Morenci | Sulfide | 869.2 | 0.76 | 1983 Form 10-K Annual Report |
| | New Cornelia | Sulfide | 214.1 | 0.50 | 1983 Form 10-K Annual Report |
| | Safford | Mixed | 262.400 | 0.88 | 1982 Form 10-K Annual Report |
| | United Verde | Sulfide | | | |
| | United Verde | Oxide | | | |
| ----- | | | | | |
| RANCHERS EXPLORATION & DEVELOPMENT CO. | Bluebird | Oxide | 65 | 0.53 | Pub. in Ranchers' 1981 Annual Report |
| ----- | | | | | |
| 171 V.B. SMITH ESTATE | Dynamite | Sulfide | | | |
| ----- | | | | | |
| SQUAW PEAK MINING CO. | Squaw Peak | Sulfide | 30 | 0.35 | Unpublished estimate. |
| ----- | | | | | |
| STANDARD METALS CORP. | Antler | Sulfide | 5.1 | 1.95 | With 4.13% An, 0.94% Pb, and 1.05 oz Ag/ton. Pub. in 1978 Annual Report & Form 10-K. |
| ----- | | | | | |
| STRONG & HARRIS | Strong & Harris | Mixed | 60 | 0.60 | Unpublished estimates with 0.70% Zn. |
| ----- | | | | | |
| SUPERIOR OIL | Pine Flats | Sulfide | 12 | 0.50 | Unpublished estimate. |
| ----- | | | | | |
| UNDETERMINED | Mineral Hill | Mixed | | | |
| ----- | | | | | |

TABLE XXIII (Cont.)
COPPER RESERVES IN ARIZONA 1/

| COMPANY | DEPOSIT | MAJOR MINERAL TYPE | MILLIONS OF TONS | AVERAGE Cu CONTENT | REMARKS/SOURCE |
|--|-----------|--------------------|------------------|--------------------|----------------------|
| UNION OIL | Turquoise | Oxide | 10 | 0.50 | Published in 1975 |
| UNITED STATES GOVERNMENT | Park Hill | Mixed (?) | 30 | 0.45 | Unpublished estimate |
| UNITED STATES GOVERNMENT & U.S. METALS CORP. | Apex | Mixed (?) | | | |
| VAN DYKE COPPER CO. & SHO-ME COPPER CO. | Van Dyke | Oxide | 100 | 0.50 | Published 1977. |

1/ Reserves are given with a grade of average total copper content as of December 31, 1983, unless stated otherwise under "Remarks". As used in this table, reserves generally mean those estimated quantities of ore which, under present and reasonably foreseen technical and economic conditions may be profitably mined and sold or processed for the extraction of their constituent values.